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OTTAWA, CANADA

Modern Methods of Packing Apples and Pears

BY

A. McNEILL,

Chief, Fruit Division

BULLETIN No. 34

Dairy and Cold Storage Commissioner's Series

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LETTER OF TRANSMITTAL.

OTTAWA, June 13th, 1913.

To the Honourable
The Minister of Agriculture.

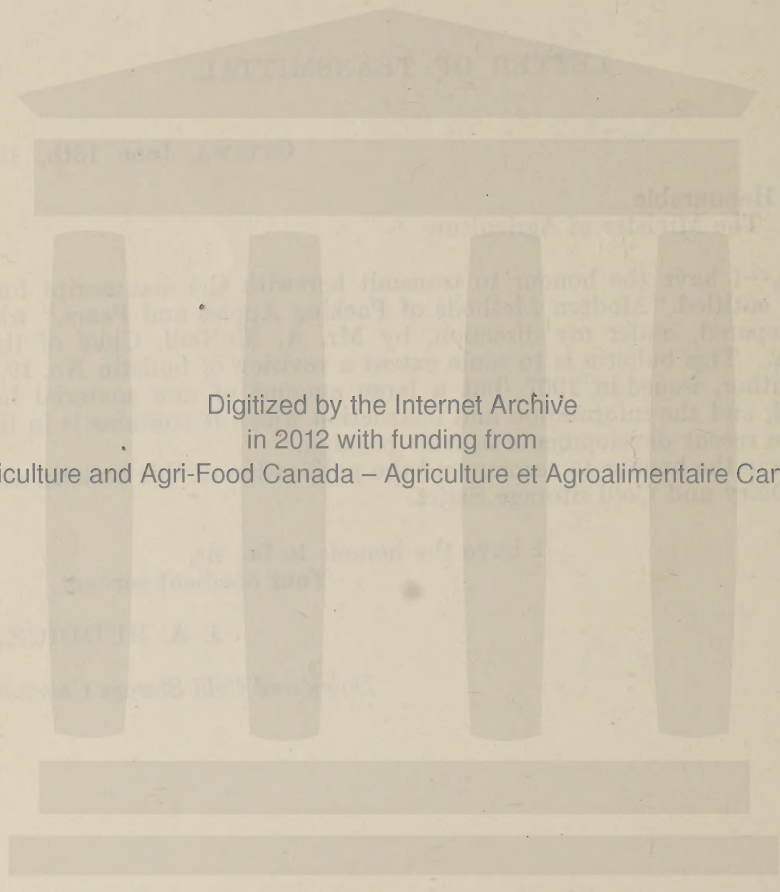
SIR,—I have the honour to transmit herewith the manuscript for a new bulletin entitled "Modern Methods of Packing Apples and Pears," which has been prepared, under my direction, by Mr. A. McNeill, Chief of the Fruit Division. This bulletin is to some extent a revision of bulletin No. 19, by the same author, issued in 1907, but a large amount of new material has been collected, and the information and instruction which it contains is in line with the more recent developments in fruit packing.

I have the honour to recommend the publication of this bulletin as No. 34 of the Dairy and Cold Storage Series.

I have the honour to be, sir,
Your obedient servant,

J. A. RUDDICK,

Dairy and Cold Storage Commissioner.



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MODERN METHODS OF PACKING APPLES AND PEARS.

By A. McNeill

INTRODUCTION.

The improvement in public taste in the matter of fruit packages in the last few years has been very marked. There is no gainsaying the fact that great improvement has taken place in both the fruit and the fruit packages that are now offered by Canadian fruit growers. There is, however, still room for improvement, though the day is past when any reputable fruit-growers would think of marketing fruit in second-hand barrels or even in soiled and clumsily made barrels or boxes.

The object of this bulletin is to enable beginners to master easily the chief features of barrel and box packing. The general principles involved are few, and in the case of barrel packing the art of doing the work is by no means difficult. The art of box packing is not so easily acquired. Yet with those who are not too far past the plastic period of youth, it is not too much to expect that a season's practice will make a fair box packer. It cannot be too strongly impressed that, while there are certain principles that must be definitely recognized and strictly adhered to, nevertheless efficiency is attained only by long and persistent practice. No oral or written instruction can take its place. It is believed, however, that a careful study of the cuts made from photographs of packages and the diagrams illustrating details will be of great assistance to the beginner.

BARRELS.

In eastern Canada the greater portion of the fruit exported is likely to be shipped in barrels for many years to come. The barrel, therefore (except for certain markets in the Canadian North-west, where boxes are in demand), still maintains, and is likely to maintain, a permanent position as a package for apples.

The minimum size of a standard barrel containing 96 quarts is prescribed in the Inspection and Sale Act as follows:—

Between heads, 26¼ inches, inside measurement.
Head diameter, 17 inches, inside measurement.
Middle diameter, 18½ inches, inside measurement.

The barrel, in common use in Nova Scotia, is made from 28½ to 29½-inch staves. The barrel in common use in Ontario is made from 30 inch staves. Its average dimensions are as follows:—

Between heads, 27½ inches.
Head diameter, 17 inches.
Middle diameter, 19½ inches.

The size varies according to the jointing of the stave, which may be ½-inch, 9-16 or 5-8. The size will vary somewhat also with the width of the stave.

There should be 16 staves to the barrel, but it is impossible to secure uniformity in size without uniformity in the jointing, as well as in the number of staves.

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The specifications for a good apple barrel call for a sound stave with 9-16 inch jointing, cut 5 to 2 inches and averaging 4 inches in width at the bilge, free from large knots or shakes. The head not less than a half-inch (hardwood 5-16) in thickness, dressed, nor more than 5-8 inch, clear and sound. The hoops should be 3-16″ on the thin side and 5-16″ on the other, in thickness, by 1 3-8″ in width, and eight in number.

In Nova Scotia the use of split hoops is quite common. These are made of birch or alder, and though they do not have the neat appearance of the cut elm hoop, they are very strong and cheap.

UNEVEN STAVES.

Apple barrels are for the most part manufactured from No. 2 staves. A careful measurement of a number of barrels from the best apple sections of Ontario showed that, while the general average thickness of the stave was 6-16″, yet there was sometimes in the same barrel a variation from 4-16″ to 7-16″; and in one instance at least the 4-16″ stave was next to the 7-16″ stave, leaving a shoulder of 3-16″.

This is a very grave defect, inasmuch as it leaves a sharp shoulder between the thin and the thick stave. When the apples are pressed into the barrel this sharp shoulder cuts into the fruit, and all the apples from the top to the bottom touching this union of the thin and thick staves will be marked more or less severely according to the difference between the thickness of the two staves.

BROAD STAVES.

A four-inch stave is the maximum width for a good barrel. Wide staves are a source of weakness. Should the barrels get somewhat dry, the danger is greatly increased. The wide stave absorbs the moisture from the apple on the inside, which has a tendency to expand, and thus overcome the curvature of the stave as it is placed in the barrel. If at this time the barrel should be exposed to the heat of the sun, the tendency would be to contract the outside of the same stave. The combined effect of the moisture within and the heat of the sun without is to cause the stave to "buckle," which, of course, results in a slack barrel.

SECOND-HAND BARRELS.

It cannot be too strongly impressed upon apple growers that they should use no packages which are not absolutely clean and bright. It is a mistake to use second-hand barrels even for the local market. For the export market it is absolutely impossible to make a profit if second-hand barrels are used. These will be sold by themselves, and notwithstanding the quality of fruit that may be in the packages, they will, on the general market, be sold at a reduced price.

BARRELLING IN THE ORCHARD.

It is probable that a very large part of the fall and early winter apples will be packed for market in the orchard. Excellent work can be done there if proper provision is made for both picking and packing. Even where the packing is done in the open air, there should be a convenient shelter to protect the packing bench, barrels, etc., during wet weather. It is also a labour-saving device to have this shelter large enough to serve as a temporary packing shed. Should rain threaten, it will often expedite matters to set all hands picking in orchard boxes or other convenient receptacles and haul to the packing shelter, where packing may go on under conditions that would be impossible if no shelter were provided.

ORCHARD PACKING BENCH.

The most convenient packing bench for orchard use is made on the same general plan as the ordinary stretcher couch or like an enlarged sawhorse, with bolts where the supports cross each other. The upper points of the supports are joined by a 2 by 2 strip as long as the required table. On these pieces of timber a sheeting of stout burlap or canvas is fastened. The end supports are braced with light pieces below, against end pressure, but in such a way as not to interfere with the bench closing for convenient transportation from one part of the orchard to the other. A slight improvement is to have the strip reaching across the table joining the 2 by 2 pieces at each end and at the middle point. The burlap is then placed over these strips, and instead of being nailed securely to the 2 by 2 pieces, is kept in place by a series of eyelet holes fitting over buttons on each side. By this arrangement the burlap can be more easily slipped off the frame during rain storms and can be dried quite easily, and, of course, will last much longer.

A very convenient improvised table for orchard packing can be made by taking an unused door, and nailing a three inch strip about the edge of it. This is covered with coarse canvas or similar material. This might be supported on two sawhorses of convenient height, or two barrels would make a convenient support for temporary purposes.

HOME COOPER SHOP.

An increasing number of large fruit-growers and co-operative associations are putting in a cooper outfit for their own use. A serviceable outfit will not cost more than $50 to $75, and any vacant outbuilding can be readily fitted up for barrel-making. Skilled workers are usually employed, but the better way is to train the ordinary help on the farm so that they can work at barrel-making during the winter months and other times when work is slack upon the farm. Any handy man with slight instructions can soon learn to make an apple barrel for all practical purposes as good as the best.

There are several advantages in making the barrels at home. Stock for barrel-making can be bought early in the season and is easily stored in this shape without taking harm. The price, therefore, is usually a third less than when an order has to be placed hurriedly with a cooper. Not only is the price less, but the chances of being left without a stock of packages is minimized. Perhaps a more important inducement for making barrels at home is that labour would be employed on the farm, so as to make it possible to retain men all the year round. One of the most serious problems to-day is the labour problem, and far-seeing fruit-growers believe that they can best solve this by furnishing twelve months' work for men, instead of six months as formerly. Making barrels at home will help the fruitgrower to secure and retain a better class of labour.

Plate I gives examples of convenient tools about the packing house and orchard. 'A.' Ordinary lather's hatchet, with extra nail-pulling notch near the point. The hatchet face should be ground off for use in barrel and box packing. 'B' is a small caliper rule, used ordinarily as a billiard ball measurer, but is exceedingly convenient to carry about to measure apples.

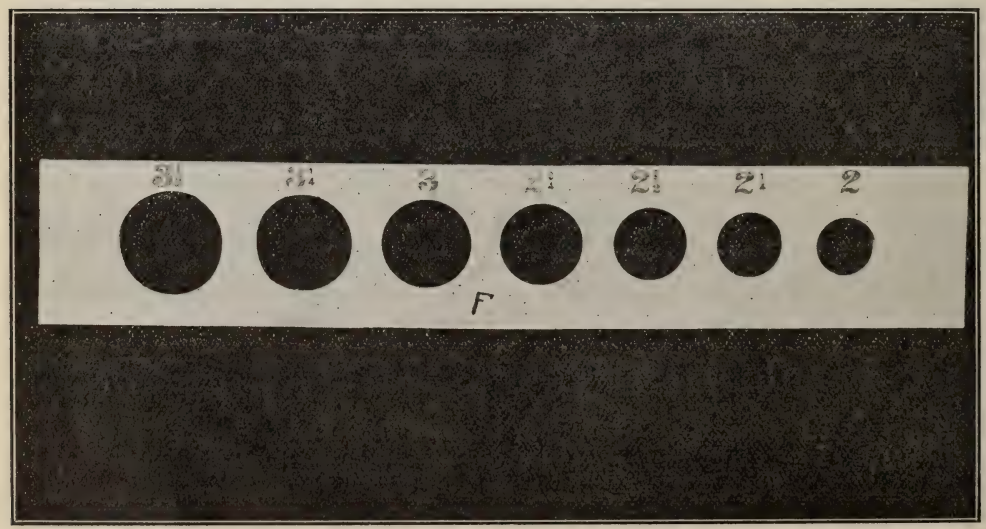
'C' is an ordinary machinist's steel calipers with centimeters on one side and inches on the other.

'D' is a side-cutting wire nipper, known among apple packers as a "stemmer." This tool cannot be dispensed with in either barrel or box packing.

'E' is a series of rings, beginning at $1\frac{3}{4}''$ and running up by quarter inches to three inches.

'F' is a gauge board such as is commonly used in packing houses. It is absolutely essential that beginners especially should have some means of testing their grading for size from time to time.

Packers' tools. Figures described in text.



PREPARING THE BARREL FOR PACKING.

The barrel is prepared for packing as follows:—It is delivered by the cooper with both heads in but no nails driven anywhere. The poorer head, if there is a difference between the two heads, is selected for the face. The quarterhoops should be forced down firmly and nailed with four nails driven in a slanting direction, pointed toward the head and clinched smooth. If they are driven crossways and not clinched very smooth, they are apt to injure the apples seriously in the process of packing and pressing. The face end of the barrel should be nailed with six or not more than eight nails. The head-liners are placed at right angles to the grain of the head so as to catch all the pieces that form the head. Four or five nails are quite sufficient in a liner.

If stencilling is done in the orchard the face should now be stencilled with the required marks. If the stencilling is not done in the orchard, then all the particulars of grade, variety, packer, etc., should be placed, with a common lead pencil, not too prominently, near the chime. The barrel is now placed on the racking plank, face end down. If pulp or paper heads are used (and they are always desirable) one is now placed in the barrel and the face arranged upon it. After the second row of the face has been properly placed, fruit is lowered carefully into the barrel. After the second basket is in place racking begins and is continued *after each basket*, until the fruit is within a few inches of the top of the barrel. The tail is now made and the tail head put into place. Nails are driven into this as into the face head. It is finished with liners in the same manner and the first hoops on each end, after being firmly driven down, are nailed in place with not more than eight nails driven into the head. The barrel is then ready to be taken to the storehouse or railway station.

PAPER HEADS.

Heads cut from heavy paper or from light pulp board are very desirable on both ends of the barrel. Corrugated heads cannot be recommended in original packing. It is doubtful, too, whether there is any advantage in using fancy paper heads.

FACING.

Facing a barrel is the process of placing a layer of apples on the face end of the barrel in rows, so as to present the neatest possible appearance, each apple touching the other as far as possible, and leaving no large spaces.

The fruit chosen for facing the barrel should be of such a quality as to fairly represent the quality of fruit in the barrel. If the apples are not graded to size it would be unfair to have the larger size upon the face. It would also be unfair to have apples of a better colour than those in the rest of the barrel. In short, the apples must be simply a fair sample of the fruit in the package. This fruit, however, should be placed to the best advantage. Presuming that the apples are not graded to size further than to meet the requirements of the grade definitions, it is recommended that the smaller facers be placed on the outside rim of the barrel, and that the second row be somewhat larger. The inner circle should be finished with one, three or four apples slightly larger in size than the second row or circle. But in no case should the face be finished with one very large apple or with one very small. Either way detracts very much from the appearance of the face.

With a little study of sizes the workman will have no trouble in adopting one of the above faces, and will not have to 'patch' a face by finishing with large or small apples, or apples turned on the side.

In arranging the apples the beginner will find that he can make great use of the difference between the minimum and maximum transverse diameters

of the apple. If the circle lacks but half an inch of being filled, or a fair sized apple will not go in, it will usually be found that by turning a few apples so that the larger diameters are in line in the circle, the space will be filled. On the contrary, if there is not room for the last apple space may be made by turning a number of the apples so that their smaller diameters come in line with the circle. Each circle on the face of the barrel should have apples in it as nearly as possible of uniform size. Any perceptible difference in size detracts from the appearance. Many packers think it worth while to carefully lay a second row of fruit over the first before the barrel is filled. A better way is to place an apple with the coloured side down over each space between the facers. A basket of apples is poured in carefully over this which finishes the work of facing.

Plate 2, Fig. 1, shows a barrel with a stave pulled out for the purpose of inspection. This, of course, does not detect packages that have been fraudulently packed by the 'stove-pipe' or 'boot-leg' method, but is a very efficient method for ordinary commercial packs, without the necessity of moving any of the apples. The stave is easily put back into place, and the barrel made as tight as before its removal. Usually the lower quarter hoop is not moved, as a sufficient view can be obtained without doing so. In re-nailing the quarter hoops great care should be taken to drive the nails in a slanting direction so as not to reach through into the fruit.

Plate 2, Fig. 2, shows one of the best makes of baskets for orchard and packing house purposes. It is strong, convenient to handle, and can be lowered into a barrel and emptied easily without injury to the fruit. A square cornered basket is objectionable about the packing house.

Plate 3 gives examples of two of the commonest facings in commercial packs, having 15 and 16 apples respectively in the outside circle, ten and eleven in the second circle, and three apples in the one case and four apples in the other in the centre. These two faces are quite suitable for all the medium sized apples of the common winter varieties.

Plate 4 has examples of faces for smaller apples where the third row consists of five apples, with one in the centre. Fig. 1 illustrates a case where the apples in the centre are not large enough to admit a single apple stem down. In this case an apple is placed calyx end down. The calyx end will scarcely reach to the head of the barrel, but acts as a wedge to keep the face tight when the barrel is filled. Although perhaps there are some objections to this it is very frequently used. It is a mistake to attempt to finish a face with two apples.

FILLING.

Filling is now proceeded with basket by basket. In no case should a basket or vessel of any sort be used for filling the barrels that would require the apples to fall even a few inches into the barrel. A basket such as is shown in Plate 2, Fig. 2, can be lowered into the barrel to the surface of the fruit already in place and can be gently tilted so as to empty its contents with a minimum of damage. This point must be insisted upon. The slight bruises which apples get in falling six, eight or ten inches into a barrel may not be immediately perceptible. Nevertheless, the tissue has been injured and in the course of a few days the injured part will show it by a flattening of the surface or a dulness of colour, and it may even be the point at which decay would begin. The remark is often made that we should handle fruit like eggs. The only fault I have to find with this advice is that it is not sufficiently drastic. It is quite possible to bruise seriously the softer varieties of apples by handling that would not break the shell of an egg, with this difference, of course, that if an egg is broken the injury is discovered immediately. Not so with the apple.

After each basket of fruit is in place in the barrel, the grader should carefully look over the fruit, and in almost every case there will be one or two apples

which should be removed. The presumption is that the grading is done rapidly, and that a different side of the apple was exposed to the grader's eye, when it was being placed in the sorting basket. This careful inspection after the fruit is in the barrel gives an opportunity for a still further rejection of imperfect specimens.

RACKING.

The process of racking consists in a sharp shake from side to side with the object of settling the apples into place. Racking should be done on a solid foundation, such as a heavy plank. Even on a floor it is necessary to use a plank. It cannot be properly done upon the ground. Racking should be done with a slight, sharp jar, rather than with a swinging, throwing motion. Serious injury to the fruit may result if it is thrown from side to side. No good purpose is served by any motion that would tend to throw the apples out of place. What is wanted is a slight, quick, jar *after each basketful* is placed in the barrel. If three or four basketsful are placed in the barrel without racking no subsequent racking will be effective and in all probability such a barrel will be slack after a long journey. The racking is a very important feature in good packing.

To emphasize the necessity of good racking, I quote from the report of Mr. J. N. Chute, a Nova Scotian fruit grower of many years' experience, who acted, during the winter of 1912-13, as special agent for the United Fruit Companies, Ltd. of Nova Scotia, in Great Britain. Mr. Chute says:—

'I have opened a large number of these barrels at the tail end to find out why they were slack and with only one exception I found the apples bruised to indicate that they had been headed tight enough. The causes most likely were lack of proper racking or standing too long after being headed up. I was called to look at a parcel of slack Spies. I found that the apples had evidently been pressed very hard, probably three or four weeks before shipment. The apples were bruised and each bruise had started to rot.'

A heavy plank for racking upon should be considered essential in all cases. Good racking, as has been observed, cannot be done except upon an unelastic base. Of course in orchard packing it cannot be dispensed with, but it is equally necessary in nearly all cases where packing is done in the warehouse. A floor made of inch boards over joists placed even two feet apart, is not sufficiently solid unless the barrel should happen to be directly over a joist, which can not always be counted upon. In all cases, both in the warehouse and in the orchard, provide a heavy plank for racking purposes.

MARKING RACKING PLANK.

As the packing of No. 1's and No. 2's is usually going on at the same time, it quite frequently occurs, with careless workmen, that a basket of No. 2's will be put in a No. 1 barrel, or a basket of No. 1's will be placed in a No. 2 barrel. It is not desirable, of course, that either of these accidents should take place. A safety device is to have a different racking plank for each grade. and have it painted a prominent colour, such, for instance, as white for No. 1 and yellow for No. 2. The workmen's attention is then called definitely to the grade of the barrel which he is filling.

When the barrel is full to within two or three layers of the top, a 'follower' is placed on the apples, and the packer holds this firmly in place, while he continues to rack or shake the barrel. The effect of this is to make a comparatively level surface, upon which the last process or 'tailing up 'can be done. A follower is a circular piece of plank slightly smaller in diameter than a barrel head and covered on the face with heavy felt such as is used by harness makers for pads.

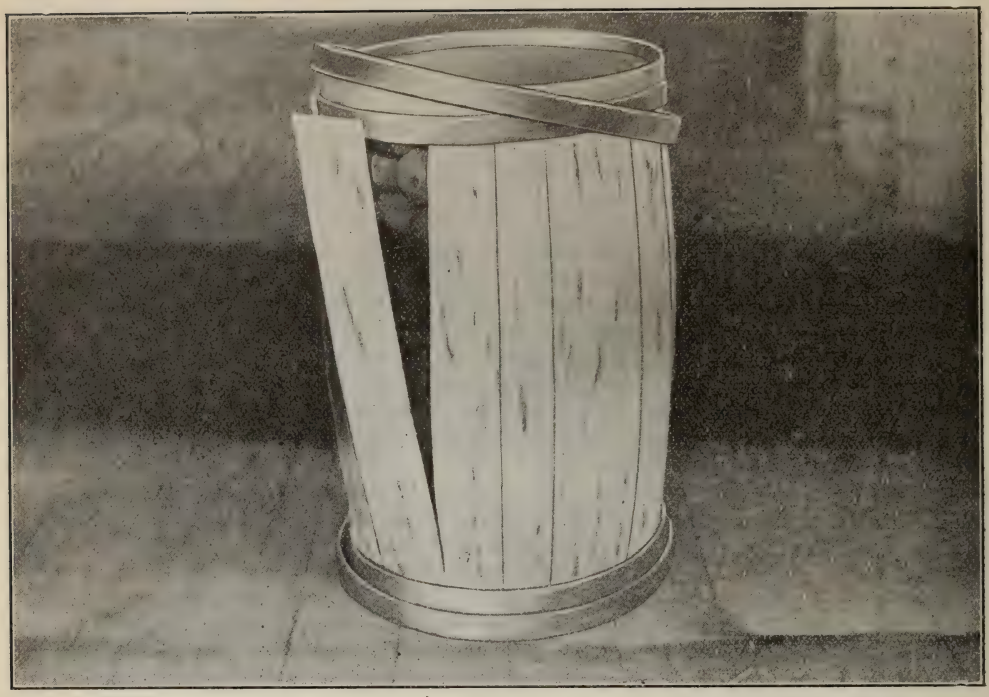


FIG. 1. Stake removed for Inspection.

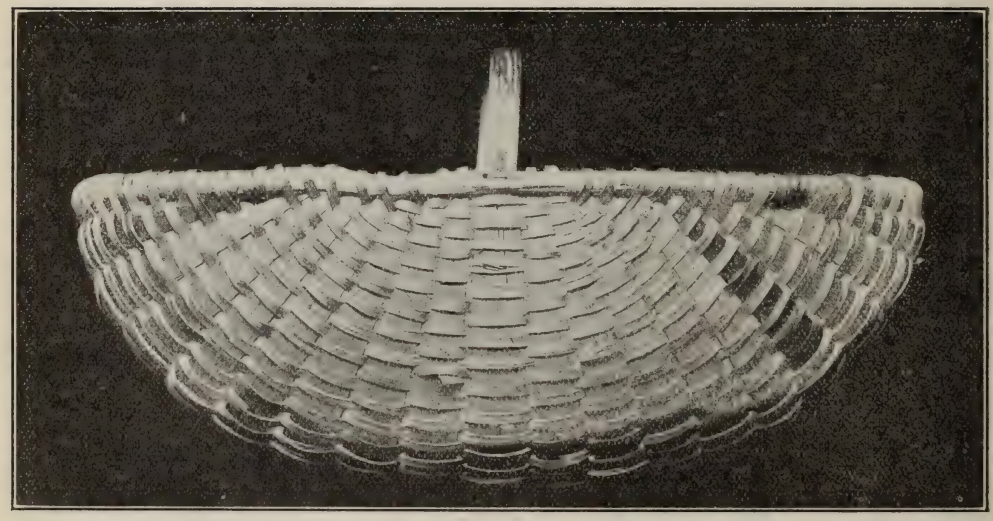


FIG. 2 Apple Basket.

TAILING.

The process of 'tailing' is the severest test of a good packer. It consists in arranging the last two or more rows of apples against which the tail head will press, so that they will reach not more than level with the top of the chime.

Nearly all printed instructions in tailing a barrel advise that the apples should project above the chime, before the head is put on, to the extent of an inch or an inch and a half. I am persuaded that any projection beyond the chime of the barrel is quite unnecessary, if the racking has been properly done, as recommended in the preceding paragraphs. The reports of the Dominion Fruit Inspectors, who open many thousand barrels in the course of a year, are almost unanimous in saying that more barrels are slack from over-pressing than from any other cause. Where the projection is above the chime it is almost impossible not to injure the apples so as to offer an entrance for rot germs, and quite apart from the natural injuries to the apples by pressing, there are secondary consequences that follow by the introduction of these germs. Over pressing is particularly objectionable in several varieties of apples that are characterized by a certain crispness, which in other material would be called brittleness, the Northern Spy being a marked example of this. It is quite possible, however, to give more pressure to a Russet than could be recommended for the more brittle varieties. As in all matters connected with apple packing, discretion must be used, suited to the various conditions under which fruit is packed and the varieties that are being dealt with.

The characteristic of good tailing is to have the apples in the last two rows placed solidly and evenly, so that when finished the head will touch with the same pressure each apple exposed. This is a very difficult thing to accomplish, even where considerable time is taken in the operation, and it is only a skillful packer who can perform this operation quickly and well. It is a common fault with unskilled packers to allow one or more apples to project above the general surface. When pressure is put upon the barrel, these apples take the whole pressure first, and are frequently crushed before the head is in place. It is advisable for young packers to open a barrel of their own packing occasionally and note the number of apples which have been touched by the head at the pressed end. If it should appear that a number of apples have not been touched by the head, and others are severely pressed, then they may rest assured that they have made a poor job of the tail. The aim should be to have equal pressure upon every apple in the last layer. This is attained by levelling the apples as they approach the top and placing a 'follower' upon this roughly levelled surface. Slight pressure is now put upon the 'follower' and the barrel is racked so as to settle all the apples into place. Some packers go to the trouble of exerting pressure upon the 'follower' by means of the ordinary apple press, being careful to use very slight pressure indeed, and after racking slightly giving the screw an additional turn and then racking again. Others, however, do it very successfully by placing the 'follower' upon the roughly tailed surface and, grasping the edges of the barrel furthest from them with the hands, bringing the elbows down upon the 'follower' and exerting as much pressure as they can while they rack the barrel backward and forward on the racking plank.

Considerable judgment is necessary to determine just how high to have the apples in the barrel before applying the follower. The aim should be to have the fairly level surface made by the process of racking under the follower, so that the apples used for making the regular tail should reach just to the top of the chime of the barrel, or perhaps slightly more in the case of some varieties. When the head is placed upon this and pressure applied to force the head into the croze, apples will be packed tight enough for export. Of course if the apples are intended for nearby markets or for immediate consumption it is much better not to press quite so heavily, so that the tail would then be slightly below the top of the chime.

The preferable position for the apple in the last layer of the tail is to have the stem end up. The next best is with the calyx end up. If an apple is placed upon the side, every care should be taken that it does not project above the surface of the general pack, even in the slightest degree, inasmuch as an apple on its side is much more easily injured by pressing than if placed with either end up.

If apples are packed for storage, rack as carefully as for shipment and then no greater pressure need be used in heading than can be exerted by hand. Usually only a 'jumble' tail is made for storage purposes.

Plate 5 gives examples of good tailing, photographed from a commercial lot without modification. It will be noted that nearly all the apples were touched by the barrel head and only in the case of one or two apples is the pressure sufficiently severe to mar their appearance.

Plate 6, Fig. 1, illustrates the proper placing of liners as at 'A'. It is also an example of careless marking, all too common in Canadian orchards. A lead pencil cannot be depended upon to be 'plain and indelible.' Such branding does not comply with the provisions of the Inspection and Sale Act, Part IX, and in any case is poor business.

Plate 6, Fig. 2, is an example of an ordinary 'jumble' tail without arrangement of any sort. This does not present a neat appearance when open. Nevertheless the main objection to the 'jumble' pack is the fact that the pressure comes upon a comparatively few apples, and these few are probably crushed, making it quite likely that if the apples remain in the barrel long, the barrel will go slack.

STEMS.

Apples make the best appearance in a barrel showing the stem end when the barrel is opened. This is the usual way in which they are placed. Great care should be taken to cut the stem so that it may not be pressed by the head of the barrel into the flesh of the apple. Stemming should not be attempted with an ordinary knife. It is almost impossible to avoid cutting the skin of the apple with the point of the knife and this injury would be as great as any that could be made by the stem. For this work secure a wire side-cutting nipper, commonly known among apple men as a 'stemmer' (Plate I, D) of medium size. This does the work rapidly and without danger of injuring the apples. Quite frequently in long stemmed varieties the stem is pressed throughout the barrel into the flesh so as to break the skin and admit rot spores. If one or more of the apples decay the whole barrel is likely to go slack. In such a case it might be advisable to stem all the apples.

LINERS.

Liners should be made of the same material as the hoop, six inches long and three-eighths wide. They should be kept in water or at least kept thoroughly damp while being used. The use of the liners cannot be too strongly recommended. They add greatly to the strength of the head and do not detract from the appearance when made of proper material and properly placed. Care should be taken to see that they run at right angles to the grain of the head, and if the head is made of two or more pieces it will be necessary that the liners support the end of each piece (Plate 6, Fig 1). A very common but unsightly substitute for a regular liner is sometimes made of small, smooth twigs, somewhat larger in diameter than a lead pencil. These are objectionable only on account of the appearance, as they serve the purpose as far as strengthening the barrel is concerned. Liners should never be omitted. A low cost machine for making liners from ordinary hoop material is now on the market. Broken hoops can be utilized.

BARREL PRESS.

There are many different makes of barrel press. These have all been tried and the consensus of opinion seems to be that, all things considered, the most convenient and efficient type is that of the screw press. It is slightly slower in action than the lever press, but has the very great advantage of being very easily adjusted to the slight differences in length in the ordinary hand-made barrel. The old time lever press is now so seldom seen that it scarcely need be mentioned. It has nothing to recommend it.

The most desirable type of screw press is shown in Figure I. Occasionally where work is being done in the packing house the lower ends are fastened to a heavy block which serves as a support to the barrel in the process of heading. Of course, this would be quite unsuitable for orchard work.

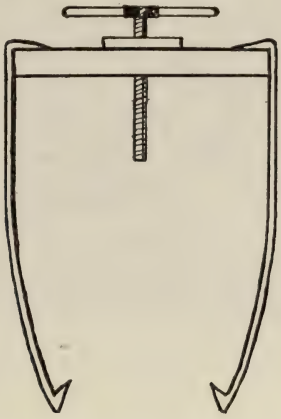


FIG. 1.

IRON CIRCLE PRESS HEAD.

In the ordinary wooden press head the greater part of the pressure comes upon the centre of the barrel head. To force the head into the croze, it is necessary to press the centre of the head some distance lower. After the head is firmly fixed in the barrel, and the pressure taken off, the head, of course, springs back. The apples are, therefore, subjected to fully half an inch more pressure in the centre of the barrel than is necessary if the pressure were applied near the outside of the barrel head. This can be done by means of the iron circle press head (Figure 2.) It will be noted that the bars A and B in the diagram are made with an arch, as in D. It will be noticed also that these bars are made with a shoulder E, to meet the inside of the iron circle C; otherwise, when the pressure comes where the two bars cross each other, there would be so great pressure on the rivets joining these to the circle that they would soon be cut off. These heads are now sometimes kept in stock by hardware men. If they cannot be procured at the hardware store, any blacksmith can readily make one. The circle should be 14 inches in diameter, and of quarter inch bar iron.

BARREL HATCHETS.

Even a man with a small orchard should not attempt to get along without a common hatchet. These hatchets are not made especially for barrel use and certain changes must be made in them before they are satisfactory. The hammer face of the hatchet is usually deeply hatched to suit the need of the lathers and others who use them for driving nails. For working about barrels this is a

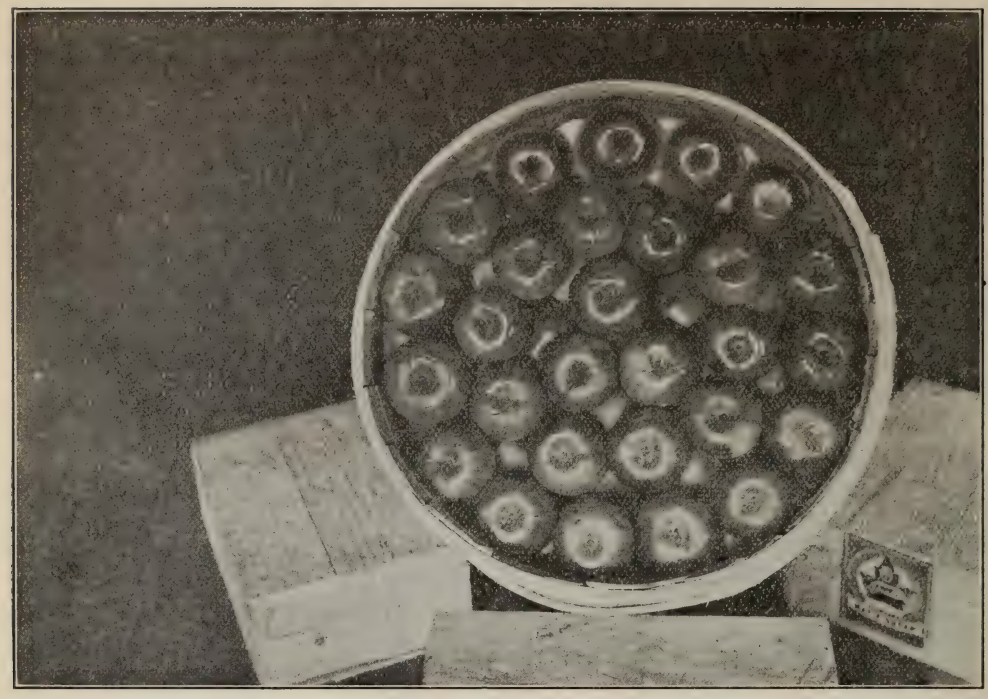


FIG. 1. 1st Row, 15; 2nd Row, 10; 3rd Row, 3.

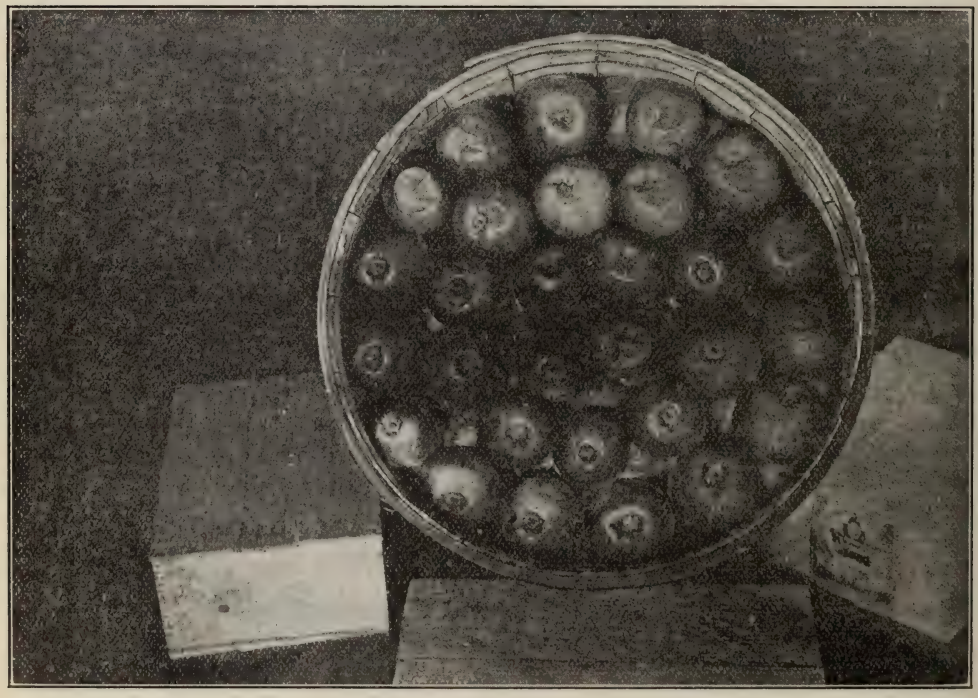
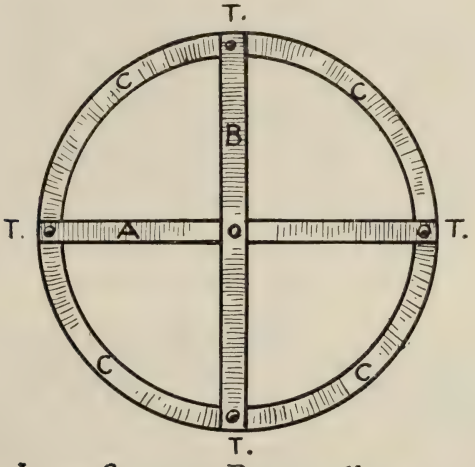


FIG. 2. 1st Row, 16; 2nd Row, 11; 3rd Row, 4.

grave defect. The hoops are badly cut by this hatched face, and the barrel head is also marked, even by the slightest tapping. The hammer face should be smoothed on an emery wheel or grindstone. The notch for pulling nails is usually placed on the inner side of the cutting edge and in a position that is not convenient for barrel use. A nail pulling notch should be cut in the edge one third of an inch from the outside corner. (Plate I, A). Care should be taken in selecting a hatchet to secure one that has a notch cut in the throat for nail pulling, with the upper surface bevelled so as to go easily under the head of a nail that is already out one-eighth of an inch or less. Only hatchets of the very best steel should be used. The pulling of nails is an important part of the use to which they will be put and for this purpose the thin edge of the point has to be used. If the temper is too hard or the steel poor the outside corner is likely to be broken off immediately. On the other hand the steel must be tough enough so that it can be made hard to maintain a reasonably good cutting edge. Discretion should be used in the weight; a medium weight is usually better than either a heavy or light weight.



IRON CIRCLE PRESS HEAD.

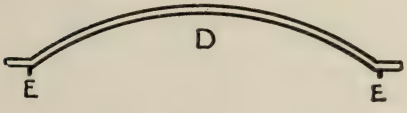


FIG. 2.

A COOPER'S DRIVER.

Occasionally apple packers use a cooper's driver made of apple wood. This, of course, is easier on the hoops and with certain rough workmen it is perhaps absolutely necessary that a driver should be used. If, however, the workmen are careful in driving hoops with a smooth faced hatchet, much more rapid work can be done than by using the driver, and quite as effective.

NAILS AND NAILING.

For the heads of barrels and for liners 1¼ inch nails are quite heavy enough. For the quarter hoops inch clout nails are preferable, although most packers use

the same nail for all parts of the barrel. There is no excuse for nailing the second hoop on each end. It is almost certain to spoil two or three apples to such an extent that decay may readily occur, resulting in a slack barrel. It is a common mistake to use a large number of nails in the head. It adds little or nothing to the strength of the barrel and makes the work of opening it extremely disagreeable and this feeling of irritation quite frequently has an influence on the buyer's estimation of the fruit. Six nails in each head or eight in the case of a three piece head, are all that are required. The main reliance for keeping the barrel in shape is upon the top hoops and liners. If the top hoops are properly placed and of proper size, it is practically impossible, even without nails, for the head to leave the croze without breaking. The weakest point, of course, is the union of the different parts of the head, and it is across these that the liners are placed. The nails for quarter hoops should be fully clinched with the point of the nail toward the face. Otherwise the apples will be seriously injured in the process of packing and pressing.

Great care should be taken in nailing on the liners. Nails should be driven at such an angle that the point will just pass through the stave and reach the second hoop. If by accident a nail should be driven so that it projects upon the outside, it should be carefully drawn and re-driven properly. Do not attempt to clinch it. In all probability at least a dozen human hands will come in contact with the chime of each barrel in the process of handling it from the orchard to the consumer and it is almost impossible to move the barrel carefully without running the hand around the chime. Should there be a projecting nail point the hand receives a dangerous wound. It should be made a criminal offence to leave the point of a wire nail projecting upon the outside of the rim of an apple barrel.

OPENING AND CLOSING BARRELS.

It is often necessary to open barrels in order to show fruit to a prospective customer or to observe whether there is a proper pressure or not.

In opening barrels one liner should be carefully removed. This can be done without breaking the liner, the nails in which should be driven back carefully but not necessarily completely out of the liner. Four nails of the first hoop are then pulled upon the spliced side of the hoop. The hoop is now gently raised until the hatchet edge can be inserted between the hoop and the stave. The edge of the hatchet is now inserted between the edge of the head and the staves, opposite the liner that is still in place. If this is done with reasonable care the head may be removed and the fruit inspected without removing the second liner.

After the inspection the fruit is placed back in position, the different pieces of the head put in place, and the top hoop is replaced very carefully. The head is then pressed back into the croze, the top hoop being pressed down immediately to hold it in place. The head is then secured and the liner put in position as before.

MARKING BARRELS.

The Inspection and Sale Act makes the following marks compulsory on every closed fruit package,—

(*a*) The name and address of the packer preceded by the words 'packed by.'

(*b*) The variety of fruit,

(*c*) The grade of the fruit.

Figure 3 is a sample of a stencil containing all, but nothing more than, the actual marks required by the Inspection and Sale Act. Other marks, however, are in nearly all cases added. It is desirable to be able to trace the

packing to the workman in charge. The foreman of the packing gang is usually designated by number. This number is placed upon every barrel for the packing of which he is responsible. Such numbers, if used, should begin above 10 so as not to be confused with grade marks 1, 2 and 3.

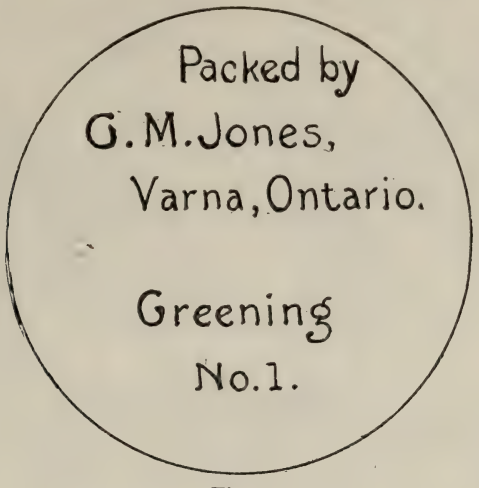


Fig. 3.

The reputation of Canadian apples is now a valuable asset to Canadian growers. Hence the desirability of having the name 'Canadian' appear upon all apples exported. Beyond this it is doubtful whether it is any advantage to add other phrases that distinguish directly or indirectly the quality of the apple.

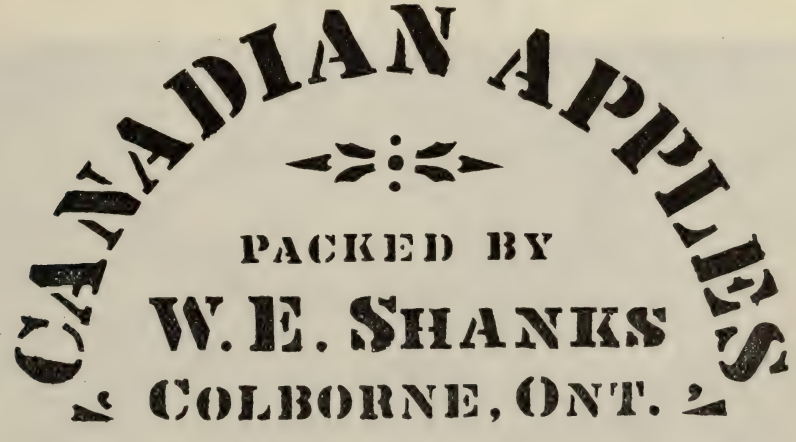


Fig. 4.

Many Canadian packers have secured a trade mark which appears regularly upon their stencil. This trade mark, if it contains no descriptive phrase, may appear upon all grades.

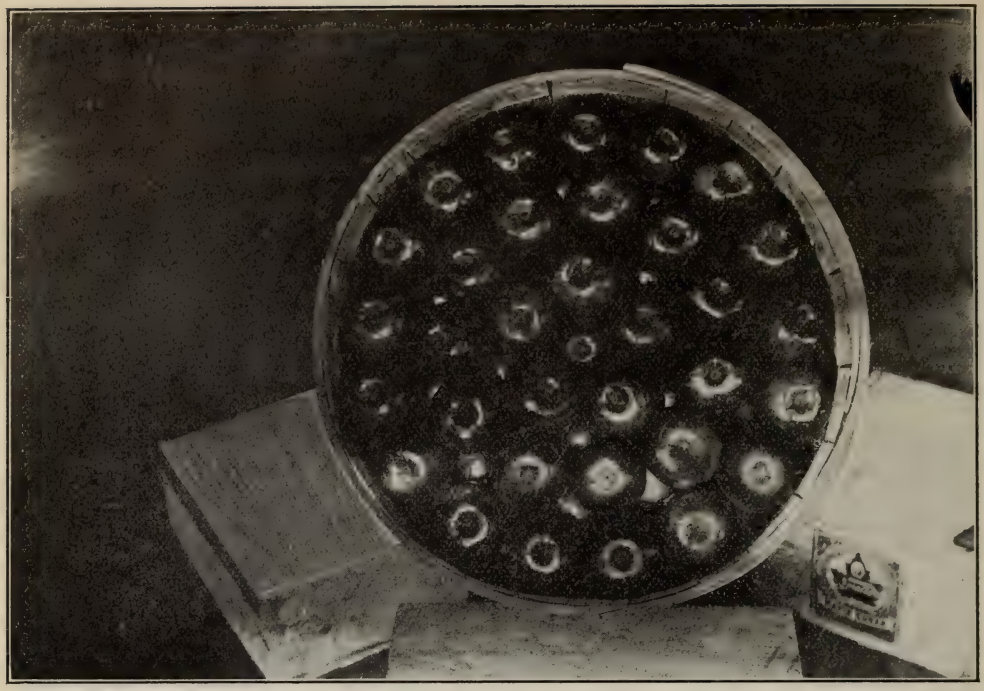


FIG. 1. 1st Row, 17; 2nd Row, 11; 3rd Row, 5 (Wedge).

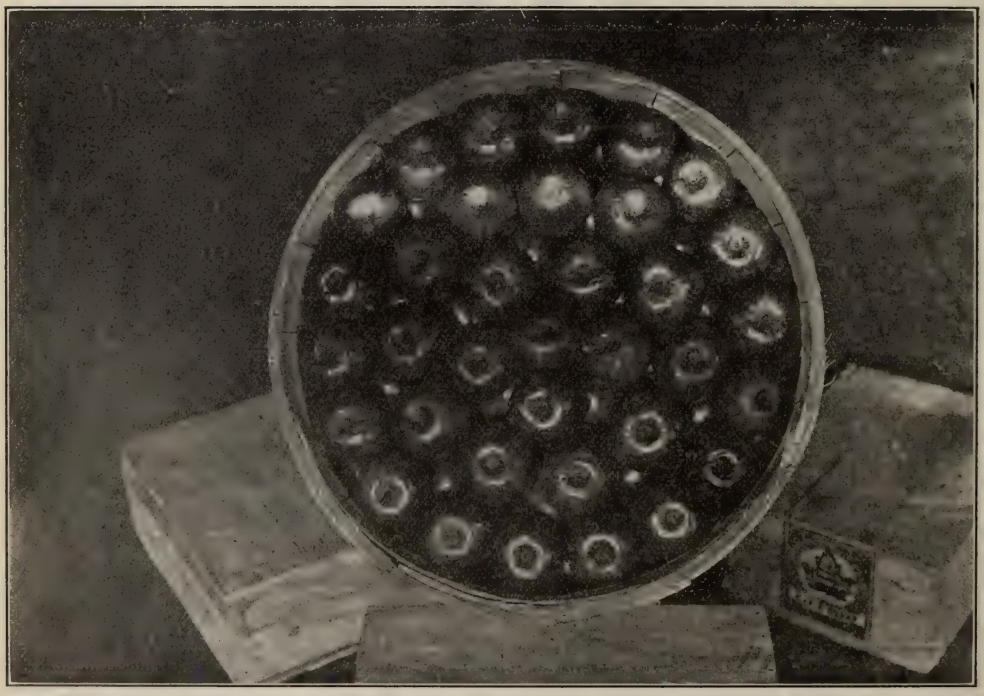


FIG. 2. 1st Row, 18; 2nd Row, 11; 3rd Row, 5; Centre, 1.

Figure 4 is a sample of a stencil that is highly commendable. 'Canadian apples' stands out prominently, which is the first consideration. The second point is the packer whose name appears in fair sized letters. Having these two items, the address, grade mark and variety follow in good sized letters but not so large as to obscure other features. There is the least possible work in stencilling the head of the barrel, a consideration that must not be neglected where thousands of barrels are handled.

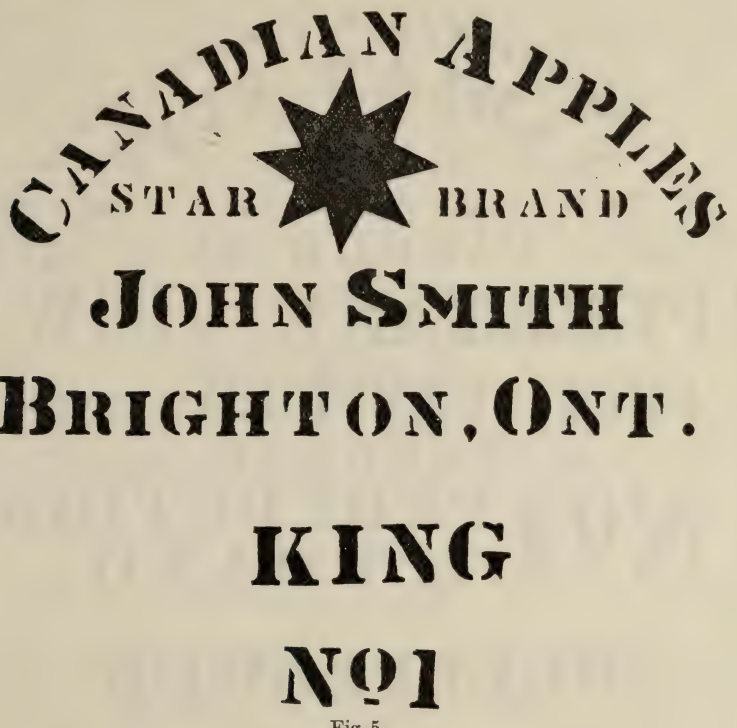


Fig 5.

In figure 5 the general balance of the stencil would be greatly improved by having 'Canadian Apples' in larger letters. 'Brighton' would be, perhaps, quite as distinct and in better balance if in smaller letters. A feature of this stencil is the star as a brand, stencilled in red. This is undoubtedly good and will quite repay the extra work of having a pot of red stencil ink at hand as well as the black.

Figure 6 has several objectionable features. Altogether too much is attempted. The ornamental marks at the outside if well done might serve a purpose, but this is too fine a class of work to be attempted on the coarse surface of an apple barrel, and consequently has a dauby look that is objectionable. 'Canadian Apples' should be more prominent and the words 'Grown and' omitted. The name of the company, unfortunately, is too long to be convenient for stencil purposes, yet is it necessary that it should be used; consequently all other features that unnecessarily take space should be eliminated. The phrase 'Perfection Brand' is objectionable. If the word 'Perfection' carries with it its ordinary meaning, then it is contrary to the provisions of the Inspection and Sale Act, inasmuch as it is inconsistent with No. 1 which is not a perfection grade. If it is simply a name indicating one kind of No. 1 then it is a very clumsy attempt at a designation of grade. What should be aimed at in a brand is to give as prominently as possible the essential facts with refer-

ence to the fruit within in the simplest and most straightforward way. Ornamentation on a barrel head by the use of the stencil offers few opportunities for high art.

Occasionally labels are used, with the design lithographed on heavy paper. This is seldom satisfactory. They are somewhat expensive, do not stand the exigencies of barrel shipments, are quite unsightly in the case of a barrel that has been opened, and for these, and perhaps other reasons, are not to be recommended.

Fig 6.

STENCIL INK.

Nothing detracts more from an otherwise good package than imperfect or slovenly stencil work. The requisites for good stencil work are good stencil ink, and a fairly stiff, round stencil brush. The ink should be thin enough to work freely into the fibre but not so thin, or made of such material as will cause it to 'run' under the stencil, even in the direction of the fibre of the wood.

Paint manufacturers have given attention to stencil ink of late and nearly all city paint stores keep excellent qualities in different colours, a supply of which every large fruit grower should have on hand in the ordinary hermetically sealed cans.

A fairly good home-made substitute for stencil ink can be made by mixing lamp black and ordinary coal-oil. This should not be too thin. For use keep it in a tin can large enough to admit a stencil brush easily. In it place a fairly large sponge. The sponge will ensure the proper quantity of ink on the stencil brush at all times.

A still better substitute is ordinary printer's ink, thinned with coal-oil. This will keep in a similar receptacle, using the sponge in all cases.

Shoeblacking is occasionally used but it smudges very easily, even when dry.

GRADING TO SIZE IN BARRELS.

In the definition of No. 1 apples the fruit has a minimum size of 'not less than medium for the variety.' It is the almost universal practice of Canadian apple packers to place the medium size and all above that in the one barrel. A few progressive packers, however, are adopting the plan of making two sizes in the No. 1 grade, especially for certain varieties that vary considerably, such as the Spy. Much can be said in favour of this practice. Undoubtedly a better impression is made upon the buyer when the fruit within a given package is of a uniform size. In addition to this there is an economic advantage, inasmuch as different buyers place a different value upon size, certain dealers requiring large apples for their trade, others requiring a medium size.

A difficulty in marking presents itself where this method is used, from the fact that in the case of barrels there is no recognized mark used to distinguish size within a grade. Perhaps the better way to designate such grading is to place, under the grade mark, the minimum and maximum size in inches. If, in the judgment of the packer, 2½ inches would be 'medium size for the variety' that he is packing, and 3 inches the maximum of his grade of smaller apples, then under 'No. 1' would be placed the figures '2½–3.' His larger Number 1's then would be 3 inches and upward or, to allow for a certain amount of overlapping, he might make his larger grade $2\frac{3}{4}$ and upwards. Of course the same method could be used for the No. 2 grade.

An objection has been made by some packers that large apples packed by themselves in barrels do not carry nearly as well as a mixture of medium size and large apples. This, however, has not been the subject of accurate experiment, and it is doubtful whether there is a sufficient loss on large apples packed by themselves to make it an offset for other considerations. Although this matter of grading to size in barrels is not a common practice, nevertheless it deserves consideration from those who wish to improve their pack.

ORCHARD BOXES.

The use of orchard boxes cannot be too strongly insisted upon in harvesting apples. Barrels or shipping boxes, when used for handling fruit in the orchard, almost necessarily become soiled and a soiled package is a cheap package, notwithstanding the grade of fruit that may be in it. These boxes give great facilities for handling the fruit safely and profitably. They can be filled in the orchard and if rain threatens can be quickly transported to a packing shed or an empty building on the farm, where good ventilation can be secured, and packed safely one above the other. They preserve the fruit from injury and facilitate quick handling.

The box should be made to hold a bushel of apples without heaping. Many manufacturers of packages keep a box quite suitable for this purpose in stock, they being used largely for handling tomatoes.

To facilitate stacking these boxes, a 1½ inch slat is nailed across the box at each end. These slats do not interfere with filling the box or with emptying it, and prevent the corner of the upper box pressing into the fruit in the lower one in case it is not placed precisely above the other.

IDENTIFICATION AND INFORMATION CARDS.

With the improvement in the public taste for good fruit comes the desirability on the part of the apple growers of meeting this demand, and inasmuch as the value of a variety depends largely upon its season and the use to which it is put, it is expedient for the apple packer not only to give the bare facts that the barrel contains a certain variety of apples, but additional information with

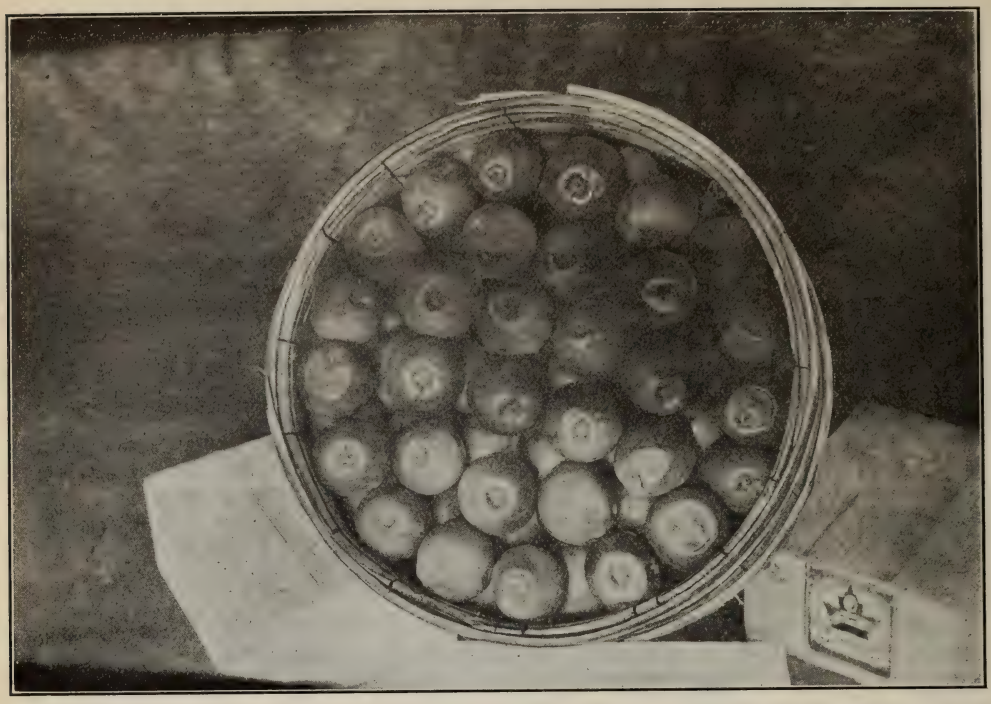


FIG. 1. Tailing.

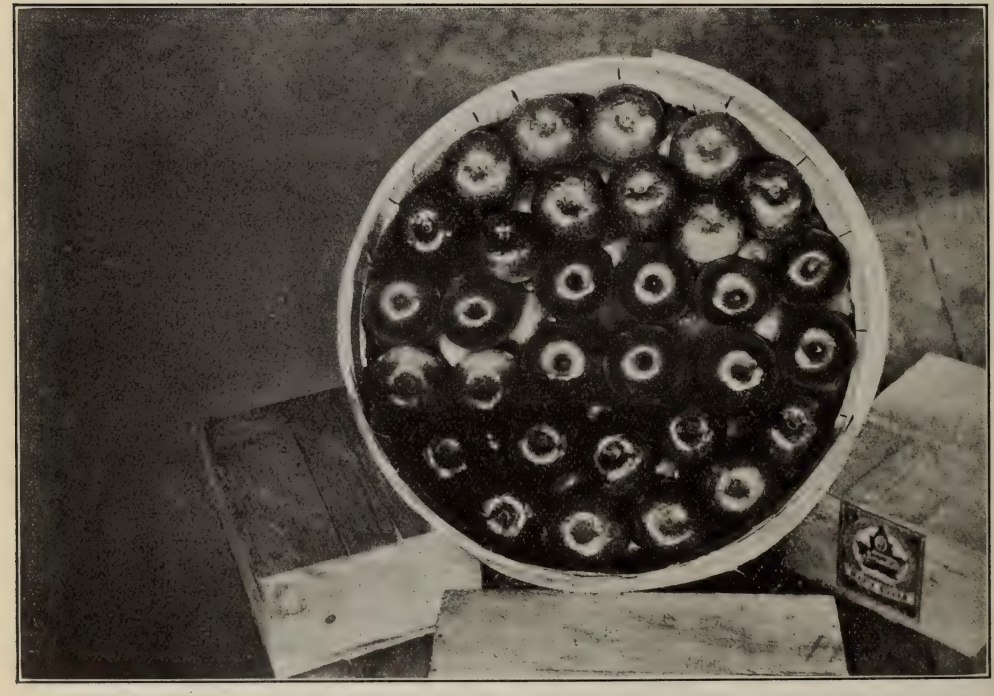


FIG. 2. Tailing.

reference to the specific qualities of the variety may very well be added. This additional information is now frequently placed on a separate card, and one of these cards placed in each package of fruit.

It may be taken for granted by the fruit-grower that notwithstanding the improved taste and the willingness of the public to pay for better fruit, few of them know the qualities of each variety, nor the best means of keeping these varieties. It is surprising how few housewives know the value of different varieties for different purposes—the McIntosh, for instance, for dessert purposes, and the Tolman Sweet for baking. The Fameuse is regarded universally as the highest type of dessert apple. Only occasionally do we find its merits recognized as a cooking apple, for which purpose there are few superior, with those who like an apple that breaks down in the cooking. The Fameuse, of course, cannot be recommended on the score of economy for culinary purposes; yet to the housewife who wants a particularly high flavoured and beautifully coloured jelly, few apples are better.

In the matter of keeping, too, few consumers of apples are aware of the absolute necessity of keeping the winter stock of apples in a room not higher than forty degrees and as near freezing point as possible. Of course, precautions should be taken not to lower the temperature below this.

There is also great carelessness in exposing fruit to a dry atmosphere. An atmosphere saturated with moisture will do no harm to a sound apple, and it is almost absolutely essential to keep many varieties in good condition.

Though a few growers have adopted the plan of placing cards in the heads of barrels, none have gone into details to the extent, perhaps, that is desirable; yet they serve a very useful purpose, and their use might very well be extended to all closed fruit packages. In the case of co-operative associations the price of these cards would be small. Indeed, there is no reason why a small booklet containing a number of recipes should not be printed by a central association for the use of all its members. It would do much towards increasing consumption. Such a card would not only be an identification card, but an advertisement as well. Below are given specimen cards:—

No. 10.

Should there be any imperfections in this barrel, return this card to the Canadian Fruit Company, Swansea, Ontario.

This package contains No. 1 Tolmon Sweets, prime season, Dec., Jan. and Feb. Excellent for baking. Require long cooking, in moderate heat. Store in temperature near to but not below 32°.

Lobo Co-op. Fruit Ass'n.

This package contains No. 1 Ben Davis apples. Season, March, April, May and June. Cooking apples. As a pie filler, the pieces do not break down. Much used for apple dumplings. Store in temperature near but not below 32°.

John Doe, Lyn, Ont.

PROTECTING PACKAGES.

There are special dangers in orchard packing of soiling the barrels. There is a temptation to rack without a racking plank, in which case the face end is badly fouled with soil. Frequently special efforts have to be made to get the barrels under cover after they have been packed. A packed barrel that is exposed to more than the slightest shower, or that is exposed to alternate sunshine and shower, is almost sure to go slack in a comparatively short time. In addition, it loses the fresh appearance of a package that has been protected as it should be. Unfortunately the better the original finish of the package, the more serious are the injuries of exposure. The difference between a new, finished, clean-surfaced package and one with the same grade of fruit in a weather-stained, soil-stained package, may be from 25 to 50 per cent., a sum quite large enough to form a good profit on the whole business.

Of course it is understood that as soon as the apples are packed, whether in the warehouse or in the orchard, they should be stored at once in the coolest possible place above freezing point. A caution ought to be given here against packing in very dry barrels. If from any cause the barrels have become very dry, moisten them slightly inside and out before packing. Damp apples packed in dry barrels will very frequently cause weak staves to buckle inward. This is more likely to occur if the barrels are left exposed to the hot sun. The want of care of the barrels after they have been packed constitutes one of the most serious losses in the apple business of Canada.

NOTES.

See that no nail points project either inside or outside the barrel.

No packer can be considered strictly honest who has two sets of baskets, one for 'facers' and the other for 'fillers.' The 'facers' must be taken from the general pack.

Use the iron hoop heading block; it is much easier on the apples than the ordinary wooden press head block.

Avoid pounding unnecessarily upon the heads of the barrels to drive the heading into the croze. A few gentle taps properly directed is all that is needed.

Mark the name of the variety and the grade immediately in lead pencil near the chime, with the initials or number of the packer to serve as a guide when the proper stencilling is done. All permanent marks should be made with stencils and brush.

Wire hoops make a very poor barrel.

In all operations in connection with packing study simplicity and directness of motion. The work is light, but every motion is often repeated. Let each operation be completed with the fewest possible motions and therefore with the least possible effort. Having selected a method of work, let it be done the same way every time till the process becomes almost automatic.

Bad habits are sometimes unconsciously acquired by packers and sorters. Do not toss the apples about on the packing table every time you wish to select a specimen. It is quicker to select from the apples in view, and much better for the fruit.

Handle the apples as little as possible.

Cleanliness should be observed in every part of the work.

Decayed fruit should be disposed of so as not to contaminate either the packing house or the outside premises.

There should be facilities in every packing house to enable packers to keep their hands clean.

Apples that have to be wiped present a much better appearance if this is done within a few hours after they are picked. It can also be done then much more quickly.

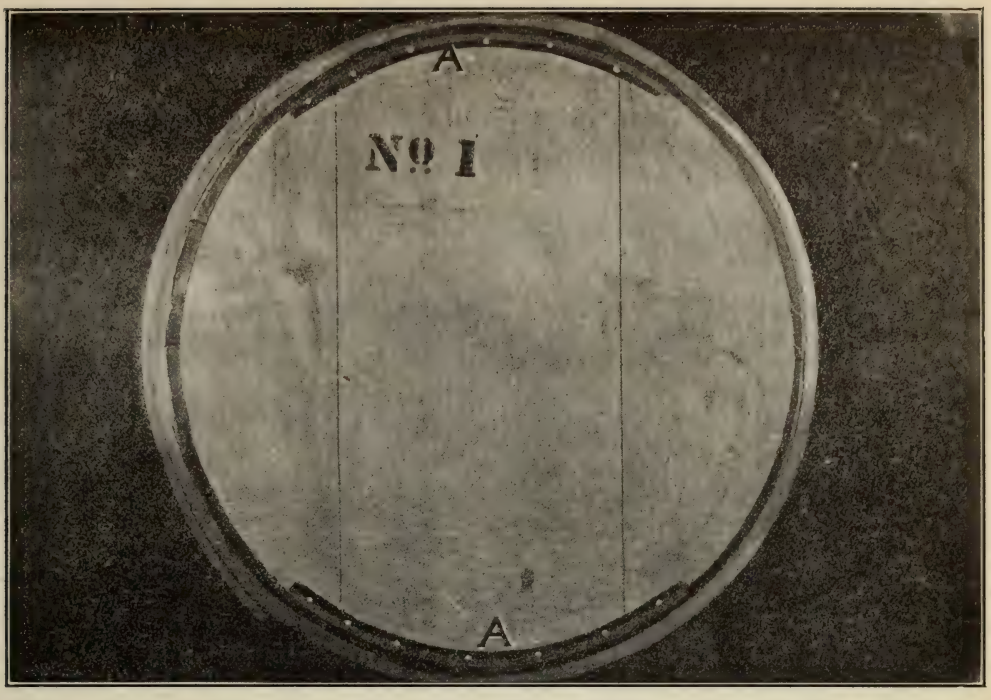


FIG. 1. Liners properly placed.

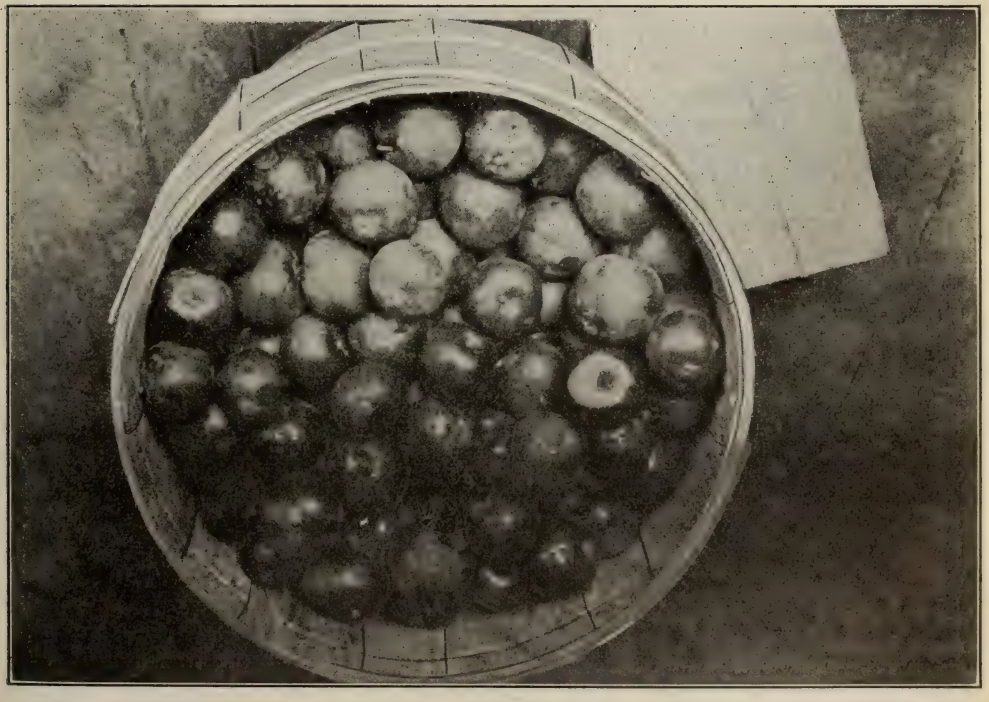


FIG. 2. "Jumble Tailing."

REPACKING FOR SHIPMENT.

It is the universal practice in Ontario to store all winter apples loosely packed, and repack them before shipment. The success of this plan depends upon the care with which the apples have been picked and packed for storage. If nothing more than hand pressure has been used on the barrels and if they have been carefully handled in spring wagons to the warehouse, there is probably no better long distance method of shipping for storage.

On the other hand, it is almost the universal practice in New York State, and indeed in all the eastern winter apple producing States, to grade closely and pack so that the fruit may be sold in the original package. Even when the best work has been done it is found necessary in almost every case to open barrels and take up the slack resulting from the evaporation during storage. Where great care has been taken in the fall packing and where the storing has been properly done, this is often very slight, requiring no more than a pulp head to put the barrel in proper condition for shipment.

The fact that one method is universal in Canada and another in the United States, under conditions fairly similar, shows that there is something to be said in favor of each method. The necessity for repacking Canadian apples arises chiefly from the imperfect work done in the orchard, which, however, must be counted upon as being part of the regular order of things until a much better class of labour than is now available can be secured. The apples will not be carefully graded and, in spite of all precautions, more pressure will be used than is necessary to keep them tight until they reach the warehouse. This over-pressure results in a slight bruise where each apple touches the other. A careful inspection will therefore show, in an overpressed barrel, six to eight barrel bruises on each apple. Some of these, of course, may be very slight, while others are serious. When these apples are repacked for shipment an additional set of bruises is made on the apples by the second pressing. On reaching their destination it is often found that the original barrel bruises have grown dark in colour and as the second set of bruises is much more pronounced than the first, owing to the fact that the tissue is somewhat broken down, it often happens that repacked apples have a very disreputable appearance after a short exposure to the air. This seriously depreciates their value and many merchants in the Northwest are now stipulating for apples in the original pack, and having an allowance made for waste. The packer can quite readily determine the percentage of waste by sorting two or three barrels of typical stock and, of course, the buyer can check the percentage by the same method. Where precautions are taken to open the barrel and take up the slack by reversing the head or using pulp heads, this method would undoubtedly give satisfaction, but would necessitate perfect confidence between buyer and seller in determining the the amount of waste.

The present Canadian method is accepted in the markets of Liverpool, London and Glasgow, and would undoubtedly show fewer 'slacks' under ordinary conditions than an original pack. So much stress is laid upon 'slacks' in the British market that it is doubtful whether a change in the Canadian method would be profitable, certainly not until the English market is educated as to what to expect.

Bulletin 24 of the Dairy and Cold Storage Commissioner's series is a report of some trial shipments of cold storage apples. Incidentally this question of repacking is touched. The conclusions are:—'Although the season (1909) was a rather unfavourable one, on account of the early deterioration of the Spies, our experience in these trials points to the possibility and the practicability of shipping carefully packed winter apples, that have been promptly cold stored, without repacking. It would be an immense advantage to the apple trade if repacking could be dispensed with.'

The case is very different in the Northwest market, and enterprising shippers will do well to experiment with shipments in original packages which have been

rendered tight by the use of pulp heads, turning the head, or in some cases by rearranging 3 or 4 inches of the tail end and perhaps tightening with additional apples.

BOXES VERSUS BARRELS.

With the development of fruit growing in Canada and the resultant competition between the various fruit growing areas, the question of packages has become one of singular importance, and at many meetings within recent years the advantages and disadvantages of the box and the barrel have been carefully weighed. There are conditions affecting the use of either one of these packages which render it impossible to answer categorically the question 'Which is the better package, the box or the barrel?'

In British Columbia the growers have decided in favour of the box package and use no barrels. A discussion on the question, therefore, refers more particularly to eastern Canada where no such decision has as yet been reached.

There are a number of factors which the grower must consider before adopting a package in which to market his fruit. Among these factors the following are perhaps the most important:—

1. The varieties.
2. The experience of the packers.
3. The trade to which the grower will cater.
4. The cost of packages and packing.
5. The cost of transportation.

The Varieties.—There are certain varieties of apples which are adapted more particularly to the box package and others which are so coarse in texture or unattractive in colour as not to merit packing in anything but the barrel. Among the former class may be mentioned Duchess, Gravenstein, Wealthy, Fameuse, Jonathan, McIntosh Red, Bellefleur, Spitzenberg, Spy and King. These varieties, on account of their fine texture and consequent value as dessert fruit, are more or less injured when packed in a barrel. This can be readily understood when it is borne in mind that when the fruit in a barrel is put under a screw press there are at least six points upon each specimen which are slightly bruised and which, therefore, render the fruit unfit for the choicest trade in dessert apples.

On the other hand, such varieties as the Stark, Ben Davis, Baldwin, Wolf River, Gano, &c., coarse in texture and not high in quality, are not so well adapted to the dessert trade. Moreover, such apples are not injured so seriously by barrel packing as the more tender varieties. For this reason, therefore, varieties of coarse texture are usually more profitably handled in barrels.

Experience of the Packers.—The art of barrel packing is not a difficult one to acquire. The ordinary farm labourer after some instruction and demonstration from an experienced packer, ought to have grasped the more essential features of the operation, and with a little practice become an efficient packer, except in the matter of tailing. Box packing, however, is not so easily mastered. It is somewhat complicated in its principles and cannot be applied except after considerable practice. It will be conceded, therefore, that the difficulty of box packing and the scarcity of skilled packers in eastern Canada are features against the adoption of this package.

The Trade to which the Grower Caters.—In all large cities there are two extreme classes of customers. On the one hand there are the customers anxious to obtain the very highest quality of fruit and who consider the question of price subordinate. This class comprises only a small percentage of the population of any city. Their needs can be supplied only by boxed fruit, and in spite of the small number this trade is seldom over-supplied. On the other

hand there are the great majority of customers who want their fruit in barrels, and this market is frequently over-supplied. The matter of price with them is a first consideration and they are obliged to take a cheap grade of fruit upon which as little money as possible has been expended by the producer. These, of course, are two extremes and between them there are all gradations.

The Cost of Packages and Packing.—There is a slight difference in cost between the barrel and the box and this difference is in favour of the former. The cost of barrels varies of course. In Ontario, during the busy season, growers often pay as high as fifty cents each for barrels, and in some parts of Quebec and Nova Scotia they may be obtained for as low as thirty cents. The best boxes cost between 14 and 18 cents. As there are a little over three boxes in a barrel, the latter package has a slight advantage. The saving may be placed at approximately 5 cents per barrel; even this would be a serious item, particularly in the case of cheap apples, and might be sufficient to decide a grower in favour of the barrel.

The difference in cost of packing is trifling also, presuming that skilled box packers can be obtained. On the Pacific coast, packers are usually paid at the rate of 5 cents a box for packing, and in some cases—but more particularly in the Western States—as low as four cents. The cost of packing a barrel may be placed at 15 cents.

The Cost of Transportation.—The barrel, on account of the fact that it is equal in quantity to a little more than three boxes, can be handled by one man in about the same time that he would handle half the amount of fruit in boxes. There is therefore a saving in favour of the barrel, not only in the orchard but in loading cars and steamships, handling on the docks, in auction rooms and warehouses. This saving of labour will give an ultimate advantage of perhaps four or five cents to the barrel.

BOX PACKING.

The box is the universal package in British Columbia and the Western States. The quality of apple so far sent from these districts has been excellent, and the fruit has sold for comparatively high figures. Eastern growers are beginning to appreciate that if they propose to cater to the high priced trade they must pack in boxes. In any case there has been a distinct revival of interest in box packing in eastern Canada and it is certain that a continually larger quantity of eastern apples will be packed in boxes.

As noted in the preceding pages, there are many pros and cons with reference to the box. One fact stands out as being established beyond question, namely, that if boxes are to be used at all, the packing has to be properly done, the fruit has to be above the average in quality and properly graded, and the whole package must be made attractive. Without these attributes boxes cannot be profitable in any market.

Undoubtedly the art of packing boxes is more difficult than that of packing barrels. Indeed, it has been said that good box packers, like poets, are born, not made. Nevertheless, experience has shown that there are many who possess the qualifications for good packers; all that is needed is the development of these latent qualities.

Wherever it can be obtained, personal instruction by a trained packer is desirable, but it is not absolutely essential. Any person having a deft hand and a well trained eye can follow the instructions given in this bulletin, and in time become proficient in the art of box packing. With the best of instruction it will take at least two seasons to become thoroughly proficient in the art.

The Box.

The size of the Canadian apple box is 10 x 11 x 20 inches, inside measurement. This is obligatory for the export trade. It is recommended that the box should be made with the following specifications:—The end pieces not less than $\frac{3}{4}$ inch nor more than $\frac{7}{8}$ inch thick; the sides not less than $\frac{3}{8}$ inch; the top and bottom $\frac{1}{4}$ inch thick. These dimensions cannot be changed to any great extent. If the ends are thicker, there is an unnecessary weight of wood and a clumsiness in appearance that detracts very materially from the value of the box. It is important that the sides should be heavy enough not to yield too easily to pressure in packing. If the sides are thinner than $\frac{3}{8}$ inch, the pressure exerted by the packing of the third and fourth layers will render the first and second layers slack. On the other hand, if the sides are heavier than $\frac{3}{8}$ inch, an unnecessary weight is given to the box. In actual practice it has been found that there can be little deviation in the thickness of the top and bottom. Three-eights inch is so thick that it is impossible to get the proper swell on top and bottom, and the fruit in the box soon goes slack. It cannot be lighter than $\frac{1}{4}$ inch, unless the wood of which it is made is exceptionally good, as it will not be strong enough.

Too frequently there is very great carelessness as to the quality of the material that is put into the box. A deficiency in the quality of the wood cannot be made up by increasing the thickness of it. If the material for the ends is not good enough for a $\frac{5}{8}$ inch thickness, it is not good enough when it is made an inch thick. This applies with even greater force to the top and bottom. No matter what variety of wood is used, it must be strong, elastic, straight-

grained, and should be entirely free from shakes and knots. Many of the boxes used in eastern Canada have been made from sapwood, more or less dead. Of course, when there is any attempt made to give the proper swell in the packing, these covers break. This has led some inexperienced packers to try a heavier top and bottom, which made it impossible to secure the proper bulge when finished. The best available variety of wood is probably white spruce, but many different kinds may be used for the ends and sides, though no wood is suitable for the top and bottom except such as possesses very great strength and elasticity.

In British Columbia it is quite easy to secure lumber wide enough for the top or for the bottom in a single piece. In eastern Canada this can only be done on a large scale with imported lumber. Opinions vary as to the necessity for the top and bottom each being in one piece. Beyond a doubt the ends should be one piece. But not a few packers maintain that even though the bottom of the box should be one piece, it is desirable to have the top in two pieces. It is maintained by some very strenuously that it is possible to secure a better finish and a firmer pack by having the top in two pieces, thus giving practically a double bulge.

It is needless to say that all the timber entering into the box should be of such a kind that it can be neatly worked so as to leave a smooth surface from the saw. Otherwise one side at least should be dressed. No wood should be used that will impart an odor to the fruit.

Dove tailed boxes are not a success.

Boxes made of good timber and properly nailed with wax nails do not need to be strengthened with wire or hoop-iron bands.

NAILS.

The proper nails to be used are four-penny rosined (or, as they are sometimes called, waxed) nails. They hold better than the corrugated or the smooth, and are as easy to drive as the smooth nail. Four nails each should be used for the sides, bottom and top.

Cleats.

Cleats should be used on top and bottom. When nailing on the top and bottom, nail through the cleat. If there should be any tendency to split the cleats soak them in water.

Cleats are necessary on every properly packed box:

1st. To strengthen the top and bottom pieces, which are likely otherwise to split and break where the nails are driven.

2nd. To protect to some extent the bulge on the top and bottom.

BOXES IN THE FLAT OR SET UP.

In eastern Canada it is usual for those supplying the boxes to set them up at a very slight increase on the cost in the flat; but if they are to be shipped long distances, it would be a very great saving in freight to have them sent in the flat. It is not a difficult nor a long process to nail them together in the packing house, and they occupy so much less room that many growers consider it the preferable way to order their boxes.

BOX MAKING.

A simple device for nailing boxes can be placed on any ordinary bench. Pairs of cleats are nailed to the bench so as to hold the box ends in position, 20 inches apart and perpendicularly.

By using such an appliance (see Plate 17) a workman may set up from 100 to 200 boxes per day, at a cost of about 1½ cents each, and where there are only a few thousand to make, it probably would not pay to have anything more elaborate. But with the introduction of co-operative associations, where boxes are likely to be made in large quantities to supply the needs of nearby local associations, it may be advisable to put in an automatic box-nailing machine that is run by gasoline or electric motor that will manufacture one thousand to fifteen hundred boxes per day. The machine is not expensive and would soon pay for itself.

WRAPPING.

The trend of good practice is towards wrapping all fruit except perhaps the lowest grade. Wrapping has several advantages,—

1. It serves as a cushion in the case of delicate fruit.
2. It prevents rot and fungous diseases from spreading from specimen to specimen.
3. It maintains a more even temperature in the fruit.
4. It has a more finished appearance when exposed for sale.
5. It preserves the freshness in appearance and adds to the keeping qualities.

There are also some disadvantages:—

1. It adds slightly to the cost of packing.
2. It prevents rapid cooling in cases where the fruit is not cool at the time of packing.

It may not pay to wrap cooking varieties or inferior grades, but it is essential in the case of a high-priced tender fruit, and where it is necessary to use every means to lengthen the life of the fruit.

Double wrapping and the use of waxed paper is of use where extraordinary precautions are needed to preserve the good appearance and the keeping quality of the fruit.

WRAPPING PAPER.

For apples 64 to the box and larger, use 12 by 12 paper, 72 to 104, 11 by 11, 104 to 175, 10 by 10, and for smaller apples 9 by 9. The size most in use is 10 by 10, which is called 'Standard.'

The quality of paper used for wrappers is of great importance. The white tissue, properly made, serves the purpose fairly well, calendered on one side. In many papers offered for wrapping, it will be found that they tear very readily in one direction. In rapid work the strain upon the paper is at times somewhat severe and therefore a strong paper, with fibre running both ways, is extremely desirable.

The wrapping paper offers a splendid device for advertising the business of the grower or of the selling association. It costs but a trifle more to have a design, similar to that shown below, than to have it plain. Instead of the words 'From the land of the maple,' the name and address of the grower or shipping association might be used. It is extremely desirable that the word 'Canada' should be used in every case. The maple leaf, also, is an exceedingly striking design, simple, and lends itself well for this particular purpose. A complicated design or picture is seldom satisfactory. What is required is something simple but striking.

LAYER PAPERS.

Sheets of heavy paper or light pulp board are often placed between layers. On the whole, they seem of doubtful utility. The layer paper or light paper board does not maintain its elasticity. The moisture which it absorbs from the fruit or the air causes it in the course of time to take the shape of the apples which it touches more closely, and thus renders the whole box slack.

LINING PAPER.

Lining papers for the boxes should be used for all unwrapped fruit. It costs but a trifle and adds greatly to the appearance of the box. By excluding dust the lining papers serve a useful purpose from a sanitary point of view. The paper should be in sheets 19 by 26″. Two sheets are required for each box. The sheets are placed in the box on each side, lapping over the bottom slightly, and having a fold in the lower corners, so that the paper will not be torn when the pressure is put upon it in nailing on the cover. The box is then filled, and the two sheets lapped over the top.

PACKING HOUSE.

A permanent packing house is almost an absolute necessity for the best work in box packing. The ordinary packing house, with insulated, frost-proof walls, suitable for storing winter fruit is, after all, the best packing house even

Fig 7.

for summer use. The advantages of it are many. Fixtures can be made permanent and therefore convenient. There is no time lost in shifting from one part of the grounds to another. The discomforts of disagreeable weather are reduced to a minimum. Perhaps of more importance than any of these considerations is the fact that the fruit may be kept cooler in hot days in such a house than in an open shed. In all such houses there should, of course, be ample ventilation, by means of large openings in the highest part of the wall or ceiling. If then this building is thrown open during the night and kept fairly well closed during the day, the temperature can be moderated to such an extent, that even without cold storage, for the greater part of the season apples could be packed successfully and placed directly in refrigerator or ordinary cars. Such houses, too, are often useful for temporary storing purposes, enabling the owner to make the most of his labour and his fruit.

Of course good packing can be done in the open air, but it requires much more attention, and the results are by no means certain. It is very uncomfortable packing in the chilly mornings and evenings, or in windy weather. A great deal of valuable time is lost because work cannot be attempted outdoors, even when the weather is merely threatening.

A Nova Scotian Packing Room. (1) and (2) Packing Tables; (3) Canvas Picking Bag.

PACKING TABLE.

For the best and most rapid work, packing tables are absolutely essential, These should be of two sorts, as the apple business is conducted in eastern Canada. It is impossible to get packing and grading done at the same table economically. Therefore, after the apples are brought into the packing house, the first operation is grading them into four grades: Fancy, No. 1, No. 2 and Culls. This may be done by help that knows nothing of the practical part of box packing, or rather, it is the initiatory work for box packing. The grading is best done on tables lined with canvas or burlap. These tables may be placed about the wall, working from one side, or away from the wall when work may be done from both sides. Usually it is more convenient to place these tables against the wall, the back of the table being slightly raised and of a height suitable for the people who are grading. The standard height of three feet is usually regulated by a platform of planks running in front of the table, which may be raised or lowered by means of blocks to suit the height of the graders. The packing table shown in Plate 7, (1) is better made so that it can be placed in the central portion of the room, where there is good light. This table should be lined with burlap and made so that the height can be easily regulated and large enough to contain three or four boxes of apples; the size in common use is three feet wide by four or five feet long. Such a packing table will accommodate two packers. The usual height of the table is three feet from the top of the table to the floor; but this height must be varied to accommodate the height of the packer. The sorting and packing tables should be lined with an extra sheet of burlap, fastened so that it can be easily taken out and shaken clean of all the debris that will inevitably gather on the tables. A slight variation of this to accommodate four packers is shown in Plate 8, Fig. 1.

GRADING.

The basis of rapid box packing is good, even grading. The inexperienced packer especially should have before him an even run in point of size, without which it will be difficult for him to do rapid work, or indeed do good work. Grading for quick, good work in box packing is, of course, dependent largely upon size and colour. It will not do to place apples of markedly different sizes in the same box. It is desirable neither for appearance nor for rapid packing. No accurate calculation can be made upon the style of pack, and no uniformity can be secured in the layers, if the sizes are markedly different. Nevertheless, it is impossible to secure in the apple perfect uniformity in size and shape. But this inequality in size and shape must never be so great as to offend the eye of the fastidious customer, though it is in part upon these very slight differences of size and shape that the best qualities of a good pack depend. It must not be understood that any good packer will associate two apples differing materially in size. The really skilful packer will take the very slightly flatter apples and use these at the ends of the boxes, the longer always going towards the middle of the box. But this difference in the end and the middle apples is so slight that only the practiced eye of the packer would detect it. The skilful packer will also take advantage of the slightest inequalities in shape. Very few apples are exactly symmetrical whether you cut them from stem to basin or transversely. If then the packer finds that there is a slight slackness in a row of apples which he is packing across the box, he can easily make this perfectly tight, as a rule, by simply turning the specimens one way or the other. Of course, the opposite fault of being somewhat too crowded can be remedied by the same process. Thus the packer will build up a layer from end to end of the box with apples slightly smaller or flatter in the ends, with the larger and longer ones towards the middle of the box, and yet the most critical customer would not be offended by

FIG. 1. Packing Bench to accommodate Four Packers.

FIG. 2. An Ontario Apple Packing House.

any difference in the specimens. It is perhaps not equally important to grade to colour, yet this adds greatly to the appearance of the finished box. If then the packer has the choice, he will put the lighter coloured apples in one box and the highly coloured apples in another. Both boxes may sell equally well, but neither would have sold so well had the apples been mixed in colour in each box. It is superfluous to say that it is presupposed that no wormy or scabby apples are permitted to go into boxes. This would exclude a very large part of the apples in eastern orchards. It may as well be understood, once for all, that the packer who has no higher conception of the box business than to think of it as a receptacle for scabby or wormy apples, had better pack his apples in barrels. He will get a much better price for them, and will not lower the reputation of the high-class apples that should be packed exclusively in boxes. It may be well here to draw attention to another matter of observation, namely, that very few men who have been used to barrel packing ever succeed in the box trade. Rougher methods that have served them in the barrel trade are unconsciously practised when they take up the box trade, and failure is the inevitable result. Barrel packers, therefore, who do attempt the box business must divest themselves entirely of many habits and methods of work that may not have interfered with their being fairly successful as barrel packers.

GRADING TO COLOUR.

The only qualification for colour mentioned in the Inspection and Sale Act for apples is that the fruit must be 'of good colour for the variety'. Colour is becoming a much more important element than formerly in the growing of apples and its importance is accentuated from the fact that in different parts of Canada the amount of colour which shows upon the fruit varies in certain varieties. Inasmuch, however, as apples from British Columbia on the Pacific Coast meet apples from Nova Scotia on the Atlantic coast in the Northwest provinces, and are sold side by side, the system of grading to colour must be the same the Dominion over in order to do justice to growers and consumers.

In parts of Ontario practically all the McIntosh Red have at least 75% of colour and a light coloured McIntosh is almost an exception. In some other parts of the Dominion the McIntosh does not always colour well. Of course, two standards cannot be made, and it is exceedingly important, therefore, that the fruit growers of one section should be familiar with the fruit of other parts of the Dominion with which they come in competition. Orchardists in such cases should plant only such varieties as they can grow to perfection.

There are occasionally seasons when the weather conditions are such as to cause an abnormal number of light coloured apples. Of course, the only plan to be adopted is to mark the apples just as they are found and not attempt to change the grade from year to year.

MECHANICAL GRADERS.

Perhaps there is no more alluring subject for optimistic inventors than mechanical apple graders. The apple is such a common thing and grading so essential a feature of good apple packing and yet so costly a process, that few inventors can resist the temptation of trying their skill on a machine that will do the work. It is regrettable, notwithstanding the scores of machines that are on the market, that up to the present time none have secured anything like universal acceptance as a successful machine. New graders are appearing every year, each different and, perhaps, better than the last. Mechanical apple grading like aviation, cannot be considered a hopeless problem.

There are several defects in all machines up to date. The main difficulty lies in the fact that in grading apples several qualities have to be taken into account,—size, colour, freedom from blemishes and uniformity of shape. Of

course, no grader has attempted to do more than grade to size. In this respect the latest machines appear to have accomplished all that can be desired.

But presuming that grading to size has been done fairly well, it is still necessary to grade for colour and blemishes which necessitates going over the whole stock by hand either before or after it is put through the grader. With unskilled sorters it is possible that the best of the mechanical graders may now be a saving in time, but where workmen become skilled it is practically no extra work to grade for size while they are grading for blemishes, colour, &c.

There is also a general impression that the grading by machine is more liable to bruise the apple than grading by hand. It is well, therefore, to proceed with caution in introducing mechanical graders.

STYLE OF PACK.

'JUMBLE' PACK.

The simplest method of packing a box of apples is nothing more than the barrel pack practiced with boxes. The face is placed upon the box by a method quite similar to that of facing a barrel, and the apples are then filled in upon this with no regard for regularity. It is needless to say that such a method of packing a box would result in absolute failure. The box is not nearly so well suited to this style of packing as the barrel, and consequently it is more difficult to get a tight package, and even if a tight package could be obtained in this way it is not acceptable to the customer. A number of inexperienced packers in eastern Canada have adopted this method of packing as an improvement upon barrel packing, and there are a few British Columbia packers who are putting up their 'Thirds' in this style. Such box packing is a mistake for any grade. It is infinitely better to use the barrel for that style of packing and for No. 3 grade. The package is cheaper and apples can be better packed in barrels than in boxes, This style of pack has no good features and should be universally condemned.

PACKING IN TIERS.

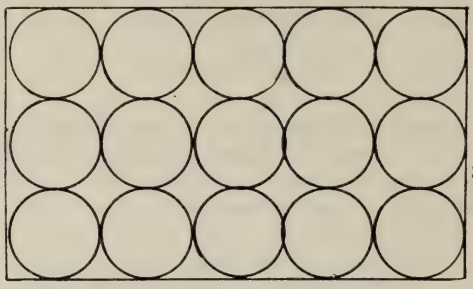
One great advantage of boxes is that close distinctions in size and colour are easily made. Customers then can secure exactly what they wish with reference to these two qualities. The number of apples in a box can be determined almost instantly by the style of the pack, but this number should always be placed on the end of the box by the packer, when he completes his work. Apples, even of the same variety and upon the same tree, vary so much in shape that it is quite possible to get an almost endless variety of packs, all fairly regular. Some practised packers claim to distinguish sixty different styles of pack. This is quite possible, if we count not only the different varieties of pack, but also the combinations of these varieties in the different layers of the box. It is not necessary, however, to be familiar with so many packs in order to be successful as a box packer. Familiarity with half a dozen or less will enable an intelligent person to pack successfully all common varieties, and having learned to use these he will have little difficulty in using slight modifications to accommodate any odd shape or size that may present itself.

From the smallest Pomme Grise that should be packed, to the largest Alexander, there are between 35 and 40 different sizes, each of which requires at least a modification in the pack. But let the beginner in box packing take heart. The very small apples and the very large ones are seldom packed. In the table which follows, giving an analysis of the packing, only 25 different sizes are recognized, and the packers of Washington and Oregon recognize only 19.

All packs in actual use are but modifications of two general types, the straight and the diagonal. In the straight pack each apple is directly over the one immediately below it and the style is varied by the size of the apples, so that there will be 3, 4 or 5 layers and rows in the box. Of course, these can be modified again by packing with the stem up or down, towards the side of the box or towards the end. Even so slight a change as placing the stem one way in one layer and the opposite way in the other will sometimes make the difference between a tight and a slack pack, though these changes are not to be recommended if they can be avoided.

The diagonal packs are made by starting the first layer of apples with spaces between them. The apples of the second layer fit into these spaces, and additional layers are added till the box is full.

FIG. 8.
STRAIGHT PACK.



No. in Box, 45.
3 Layers all packed the same.

The largest 3-tier apples are packed as shown above, all the layers being the same, and each apple being directly over the one below it.

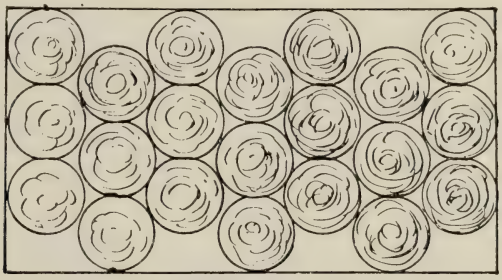
With the possible exception of the three tier straight pack, all the apples that might be packed in straight packs can be packed in the 2-2 or 2-3 diagonal pack. The straight packs have all an inherent weakness that should preclude their use except for special purposes. From the fact that each apple is directly over another in the straight pack, if one apple in any particular place decays or yields to the pressure of other apples on each side of it, this immediately loosens the whole pack; so that wherever there is a probability, or even a possibility, of one defective apple appearing, the straight pack should be avoided. In the case of the diagonal packs the softening of one apple endangers the tightness of the pack so little as to be a negligible contingency. Another weakness of the straight packs is that the pressure of the covers is not as evenly distributed, and unsightly bruises are more likely to occur. The beginner will do well to note the difference in the structure of the two packs and will readily see how much safer the diagonal packs are than the straight packs. Nevertheless the straight packs in certain sizes of apples are exceedingly attractive for exhibition purposes, and where there is absolutely no danger of decay taking place in any particular specimen, they can be used to advantage. Of course, it will be understood, too, from the nature of the straight pack, that although it looks simpler it cannot be packed so rapidly, inasmuch as the grading for size has to be much more accurate.

The offset pack is also condemned for general use. The objection to this is the number of large openings that appear when the side of the box is exposed. Indeed, this objection may also be taken when the face is exposed. Inasmuch as practically all such apples can be packed quite as conveniently in the 2-3 pack, there seems to be no good reason for using the offset.

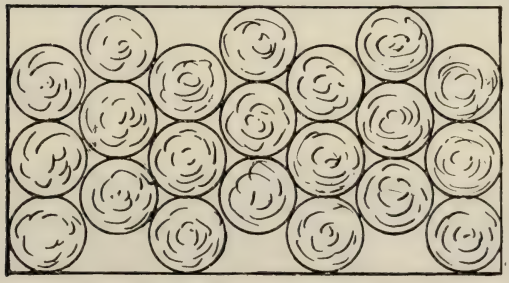
To show, however, that no positive assertion can be made with reference to the packs used, I may state that an expert in packing was obliged, at a demonstration, to use what might be called a loose offset, in order to get a proper height for the box. This was in the case of a small-sized apple. It might be noted too that a loose offset is used in peach and pear packing to very great advantage.

PACKING THE SAME SIZE IN DIFFERENT STYLES.

It is often possible to pack a certain size more than one way, and have the box in each case look equally full and appear equally tight. It will usually be found that one of these ways will take a few less apples than the other. In such cases, choose the pack that will take the most apples. This is not advised for the sole purpose of giving the purchaser the full quantity of fruit but to ensure good carrying qualities. If one style of pack takes 172 apples and another 176 of the same size, which is quite possible, it is certain that in the 172 pack there is space unfilled in the box for four apples. This space in the case of skilful packing may be so evenly distributed throughout the box that the difference in the size of individual spaces between the different styles of pack will not be noticeable. If the fruit does not stay long in the box, all the styles of pack may come out in good condition. But if the conditions are not favourable, and the fruit is subject to excessive evaporation and rough handling, the style with the most apples will stand up much longer than the other. After the apples have shrunk slightly, a very little shaking, such as would be experienced in passing over rough tracks or in shunting cars, will cause the apples in boxes with the fewer specimens to adjust themselves into the spaces, and then the box becomes decidedly slack, and in due course wasty.



(*a*) 1st and 3rd Rows.



(*b*) 2nd and 4th Rows.

FIG. 9.

OFFSET PACK.

4 Layers——84 Apples.

TIERS TO DESIGNATE SIZE.

For the designation of size the term 'tiers' is too indefinite for commercial purposes. In a general way the term '3 tier apples' would embrace all the largest apples in commerce; 4 tiers would include the medium size, and 5 tiers the small apples. The number of apples which a box contains is very easily determined by the kind of pack used. There seems to be no reason, therefore,

why the number of apples in a box should not always be substituted for tiers. Indeed, this is getting to be the common practice, and although few boxes are sent out without the 'tier' designation, it would appear that it is useless when the number of apples is given, and it is strongly to be recommended that the number of apples should be given in every case. It can be placed upon the box quite as conveniently as the word 'tier,' and it indicates with perfect distinctness the size of the apple.

The following table will be more interesting as an analysis of the different packs than as actual assistance in learning the art of packing. Nevertheless, it has its value and will well repay careful perusal, and the person who aspires to become expert must practice with the different sized apples. The table will be of service to him in suggesting the particular style of pack to adopt, and also as a ready reference to the number of apples in each pack.

2–1 *Pack.*

2–1–4–4	36 apples in the box.	
2–1–4–5	41 " "	3 tier.
2–1–5–5	45 " "	Pack on side.

2–2 *Pack.*

2–2–3–4	56 apples in the box.	
2–2–4–4	64 " "	
2–2–4–5	72 " "	$3\frac{1}{2}$ tier.
2–2–5–5	80 " "	Pack on end.
2–2–5–6	88 " "	
2–2–6–6	96 " "	
2–2–6–7	104 " "	
2–2–7–7	112 " "	4 tier.
2–2–7–8	120 " "	Pack on side.
2–2–8–8	128 " "	

2–3 *Pack.*

2–3–4–5	113 apples to the box.	4 tier.
2–3–5–5	125 " "	Pack on end.
2–3–5–6	138 " "	
2–3–6–6	150 " "	$4\frac{1}{2}$ tier.
2–3–6–7	163 " "	Pack on end.
2–3–7–7	175 " "	
2–3–7–8	188 apples in the box.	
2–3–8–8	200 " "	5 tier.
2–3–8–9	213 " "	Pack on side.
2–3–9–9	225 " "	

3 *Tier Straight Pack.*

3 wide, 3 deep, 5 long	45 apples to the box	3 tier.
3 wide, 3 deep, 6 long	54 " "	Pack on side.

Plates 9 and 10 give samples of nearly all the packs mentioned in this table.

It will be noted how readily the number of apples in a box can be determined by the form of pack. As the packer acquires skill, he will associate the number of apples with the pack, so that by simply looking at the top of the box he will, without calculation, name the number of apples in the box, providing there has been no irregularity in the pack. This number should always be stamped upon the end of the box. This is done for the information of the merchant and the consumer, who cannot be supposed to have the technical skill to recognize the number of apples by the pack.

In the following pages will be found a number of photographs illustrating practically all the common commercial packs. These will hardly need special comment. It will be an interesting study, however, to the beginner to know

Commercial Packs.

Commercial Packs.

just how the apples are placed. Special features connected with these packs are noted under the plates. The diagrams will enable anyone to make a start and acquire considerable skill. The chief requisite after all is practice and the desire to excel.

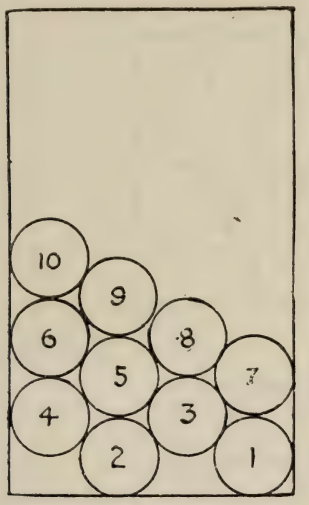


FIG. 10. How to start a "2–2" Diagonal Pack.

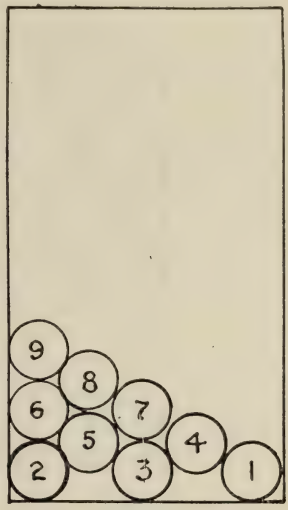
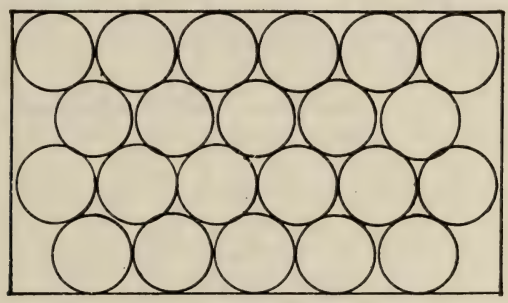


FIG. 11. Method of starting a "3–2" Diagonal Pack.



(*a*) 1st and 3rd Layers.

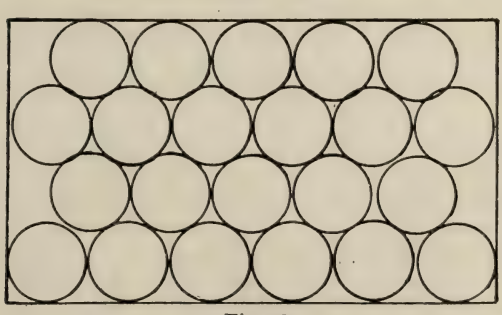
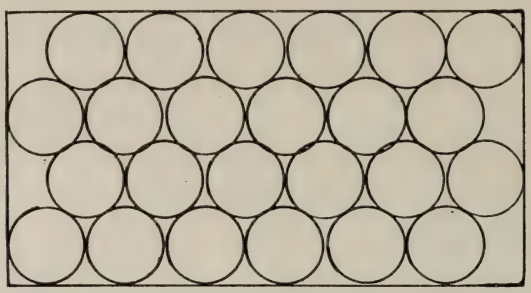


Fig. 12

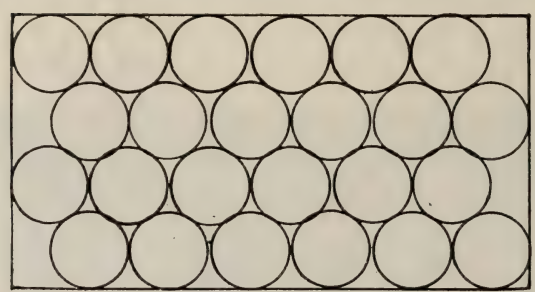
(*b*) 1st and 3rd Layers.
DIAGONAL.
"2–2" Pack.
4 Layers——88 Apples.

The art of packing can only be learned by packing. It requires a deft hand and a well trained eye, so that slight differences of shape and size may be recog-

nized and utilized to fill the box, not only full of apples, but so tightly packed that the box may be put on end with the lid off, and yet no apples fall out. This is rather a high standard, but one that should be aimed at by all who expect to become proficient in the art.



(*a*) 1st and 3rd Layers.



(*b*) 2nd and 4th Layers.

FIG. 13.

DIAGONAL.

"2-2" Pack.

4 Layers—96 Apples.

Figures 10 and 11, illustrate the methods of starting the packing of the 2-2 and the 3-2 diagonal pack. In the 2-2 pack the first apple is placed in the right hand lower corner of the box, the second apple then dividing evenly the space between the first apple and the other side of the box. These two apples are held in position by the left hand, while the third and fourth apples are placed in position as indicated in the diagram. If the space is not evenly divided by the second apple the alignment will not be correct for the rest of the box. Having once secured the correct alignment by the proper placing of the first four apples, the diagonal row is completed by putting the fifth and sixth apples in place, after which the rows are placed diagonally until the box is filled.

Similarly in the 3-2 pack. After the first and second apples are placed in the lower corners of the box, the third apple must evenly divide the space between the first and second, and must be held in position while the fourth and fifth apples are put in place. The sixth apple will now complete the first diagonal row, and the seventh, eight and ninth the second after which the box will proceed regularly to the end.

The following rules for guiding the packer in determining the pack, will be of use also to the beginner:—

1. If three apples placed side by side across the end of the box will not go in, the pack is 2-1.

2. If three apples placed side by side across the end of the box will fit tight the pack is straight 3.

3. If three apples placed side by side across the end of the box fit loosely and a fourth will not go in, the pack is 2-2.

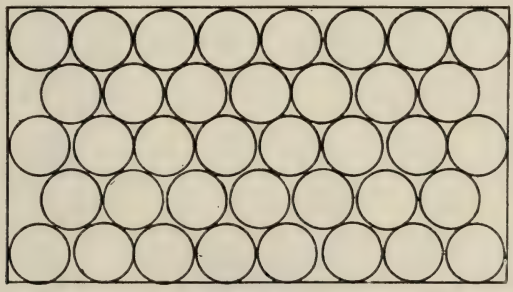
4. If four apples placed side by side across the end of the box fit loosely and the fifth will not go in, the pack is 2-3.

These rules are only useful in a general way. The packer will find many little devices that assist him, but which can be learned only by actual experience.

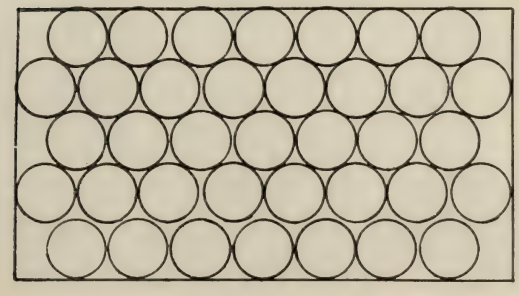
The beginner will note that the 2-2 pack or the 2-3 pack cover nearly all the commercial sizes, and once skill is acquired in the ordinary sizes of apples (those ranging from 80 to 175) it is only a matter of practice to be able to deal with the larger sizes of apples and the irregular shaped apples. It will be readily understood that a long apple like the Belleflower and a flat apple such as the Mann, though they may be the same in diameter, would require altogether different treatment in packing. One in all probability would be packed on its end, the other on its side.

Certain sizes of apples will pack so that the apples in a row, taking the length of the box, will each touch the other. A somewhat different size will be packed so that there may be a small space between each apple in the longitudinal row. This is a device by which the proper height is established. It is also one of the expedients for securing the bulge in the box, the apples being packed closer together at the centre.

In the packs having 3 rows and 3 layers or 5 rows and 5 layers the beginner should be warned to start with 2 apples in the case of the 3 layer pack or 3 apples in the case of the 2-3 pack. If the pack is begun with one apple in the 3 layer or with two apples in the 5 tier pack, then in many packs there would be one less apple than if the first row were begun with two apples in the 2-1 pack or with three apples in the 3-2 pack.



(*a*) 1st, 3rd and 5th Layers.



(*b*) 2nd and 4th Layers.
FIG. 14.—"3-2" Pack.
5 Layers——188 Apples.

This is made apparent in Figure 14. Beginning with three apples, the first, third and fifth layers are represented in (*a*) and the second and fourth layers in (*b*), and the box will contain 188 apples. If, however, the pack is begun with two apples as at (*b*) then the first, third and fifth layers will be represented by (*b*) and the second and fourth by (*a*). In this case the pack will hold 187 apples.

Of course the preferable method is the first, as it has fewer large spaces that detract materially from the appearance and permanency of the pack..

DIFFERENCE IN SHAPE.

To bring home more forcibly the difference of shape in the same varieties, 25 specimens of eight common varieties were carefully measured for the maximum and minimum transverse diameter and for the diameter from the stem to the calyx. The results are given in the table below. It will be noted that in an apple so regular as the Mann there is still a difference of a quarter of an inch and out of the 200 apples measured only ten approach a perfect circle. It will readily be seen how important it is for the young packer to perceive these differences and make use of them in order to keep the apples tight and in alignment.

Another point may be noted. Few young packers appreciate how much less the longitudinal diameter is than the transverse. Advantage is taken of this to lower or increase the height of the apples in the box, by turning them on their side or on their end, and thus determine whether it will be a side pack or an end pack.

Seek.				Mann.			
Specimen.	Transverse.		Longitudinal Inch.	Specimen.	Transverse.		Longitudinal Inch.
	Max. Inch.	Min. Inch.			Max. Inch.	Min. Inch.	
1	2·75	2·75	2·25	1	3·00	2·87	2·31
2	2·75	2·62	2·37	2	2·75	2·68	3·00
3	2·68	2·50	2·37	3	3·00	2·87	2·25
4	2·62	2·50	2·12	4	3·00	2·87	2·31
5	2·50	2·37	2·06	5	3·06	3·00	2·37
6	2·75	2·62	2·43	6	2·87	2·87	2·37
7	2·62	2·43	2·12	7	2·93	2·75	2·25
8	2·62	2·50	2·37	8	2·87	2·62	2·12
9	2·50	2·37	2·06	9	3·00	2·81	2·37
10	2·56	2·50	2·12	10	3·00	2·87	2·37
11	2·50	2·37	2·06	11	2·81	2·62	2·25
12	2·56	2·56	2·12	12	2·87	2·75	2·50
13	2·50	2·37	2·12	13	2·93	2·81	2·31
14	2·62	2·50	2·12	14	2·87	2·75	2·50
15	2·62	2·62	2·37	15	3·00	2·68	2·31
16	2·43	2·31	2·00	16	2·87	2·62	2·18
17	2·56	2·37	2·06	17	2·62	2·50	2·00
18	2·37	2·31	2·06	18	2·62	2·50	2·00
19	2·43	2·43	2·06	19	3·00	2·87	2·18
20	2·50	2·43	2·12	20	2·87	2·75	2·25
21	2·56	2·43	2·12	21	2·68	2·62	1·93
22	2·50	2·50	2·18	22	2·87	2·75	2·25
23	2·43	2·25	2·00	23	2·87	2·75	2·18
24	2·37	2·25	1·87	24	2·62	2·56	2·00
25	2·62	2·37	2·06	25	2·75	2·56	2·06
Average	2·56	2·45	2·14	Average	2·87	2·73	2·26

FIG. 1.

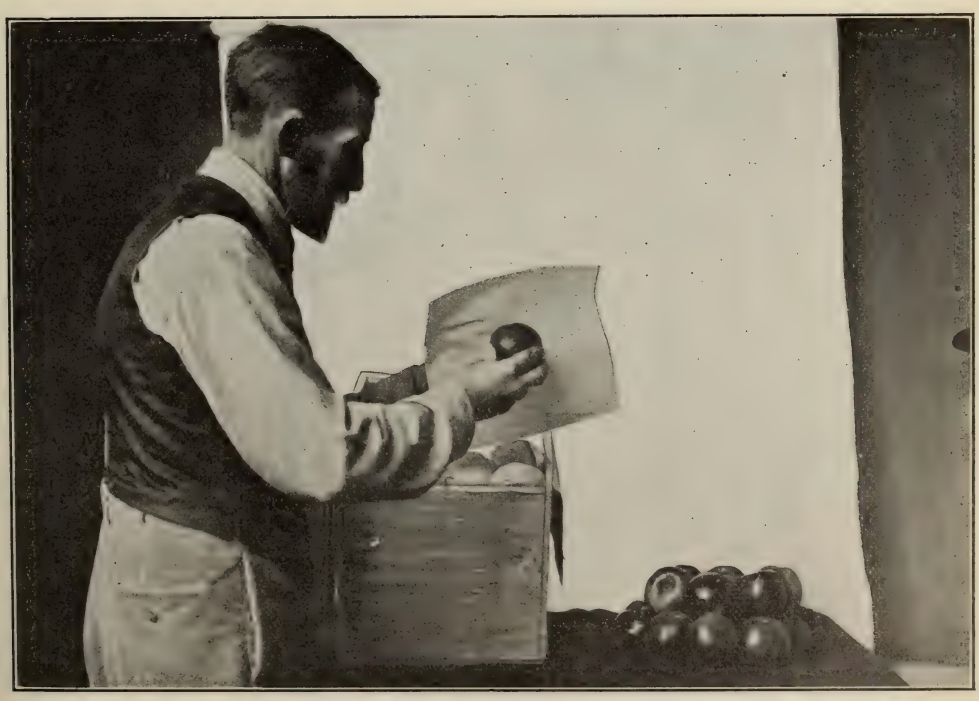


FIG. 2.
Wrapping Apples.

Stark.				Phoenix.			
Specimen.	Transverse.		Longitudinal Inch.	Specimen.	Transverse.		Longitudinal Inch.
	Max. Inch.	Min. Inch.			Max. Inch.	Min. Inch.	
1	3·25	3·00	2·75	1	3·50	3·43	2·75
2	3·25	3·00	2·62	2	3·25	3·12	2·62
3	3·12	3·00	2·75	3	3·62	3·06	2·50
4	3·25	3·00	2·87	4	3·25	3·06	2·75
5	3·12	3·00	2·37	5	3·06	2·93	2·56
6	3·00	3·00	2·50	6	3·00	2·75	2·43
7	3·00	2·75	2·37	7	3·12	2·93	2·50
8	3·00	2·75	2·50	8	3·00	3·00	2·50
9	3·00	2·87	2·50	9	2·93	2·75	2·62
10	2·81	2·75	2·62	10	3·00	2·75	2·37
11	3·06	2·81	2·50	11	3·06	2·87	2·25
12	3·12	3·00	2·75	12	2·87	2·56	2·37
13	2·81	2·62	2·50	13	3·00	2·75	2·25
14	3·12	2·87	2·62	14	3·00	2·75	2·31
15	3·12	3·00	2·62	15	3·12	2·87	2·43
16	3·06	2·81	2·37	16	2·87	2·87	2·37
17	3·00	2·75	2·50	17	2·87	2·62	2·37
18	3·12	3·00	2·75	18	3·00	2·75	2·50
19	3·00	2·87	2·43	19	3·00	2·75	2·25
20	3·00	2·87	2·31	20	3·06	2·81	2·12
21	2·87	2·75	2·50	21	2·75	2·75	2·12
22	3·06	2·87	2·62	22	3·18	3·62	2·25
23	3·00	2·87	2·43	23	2·75	2·62	2·25
24	2·81	2·75	2·56	24	2·75	2·50	2·25
25	2·75	2·62	2·25	25	3·00	2·87	2·25
Average	3·03	2·86	2·54	Average	3·04	2·87	2·40

Golden Russet.				Spy.			
Specimen.	Transverse.		Longitudinal Inch.	Specimen.	Transverse.		Longitudinal Inch.
	Max. Inch.	Min. Inch.			Max. Inch.	Min. Inch.	
1	2·87	2·87	2·37	1	3·13	3·00	2·87
2	2·93	2·75	2·25	2	3·25	3·12	2·75
3	3·00	2·75	2·31	3	3·37	3·31	2·87
4	2·75	2·75	2·12	4	3·31	3·25	2·43
5	2·87	2·62	2·06	5	3·06	3·00	2·50
6	2·62	2·50	2·06	6	3·12	2·87	2·75
7	2·81	2·75	2·31	7	3·12	2·87	2·62
8	2·87	2·75	2·37	8	3·06	2·43	2·37
9	2·75	2·62	2·25	9	3·00	2·81	2·62
10	2·93	2·75	2·25	10	3·00	2·87	2·56
11	2·62	2·62	2·25	11	3·00	2·87	2·37
12	2·75	2·62	2·25	12	3·06	2·87	2·50
13	2·87	2·75	2·50	13	3·12	2·93	2·50
14	2·75	2·56	2·06	14	3·00	2·93	2·25
15	2·50	2·50	2·12	15	2·75	2·75	2·31
16	2·75	2·62	2·31	16	2·87	2·81	2·37
17	2·75	2·62	2·25	17	2·93	2·81	2·31
18	2·62	2·50	2·25	18	3·00	2·87	2·68
19	2·62	2·50	2·37	19	3·00	2·93	2·50
20	2·62	2·50	2·12	20	2·93	2·75	2·37
21	2·62	2·50	2·06	21	2·81	2·75	2·25
22	2·75	2·50	2·25	22	2·81	2·75	2·31
23	2·62	2·62	2·25	23	2·87	2·68	2·50
24	2·62	2·50	2·12	24	2·87	2·75	2·50
25	2·81	2·62	2·06	25	2·62	2·62	2·31
Average	2·75	2·62	2·22	Average	2·99	2·88	2·50

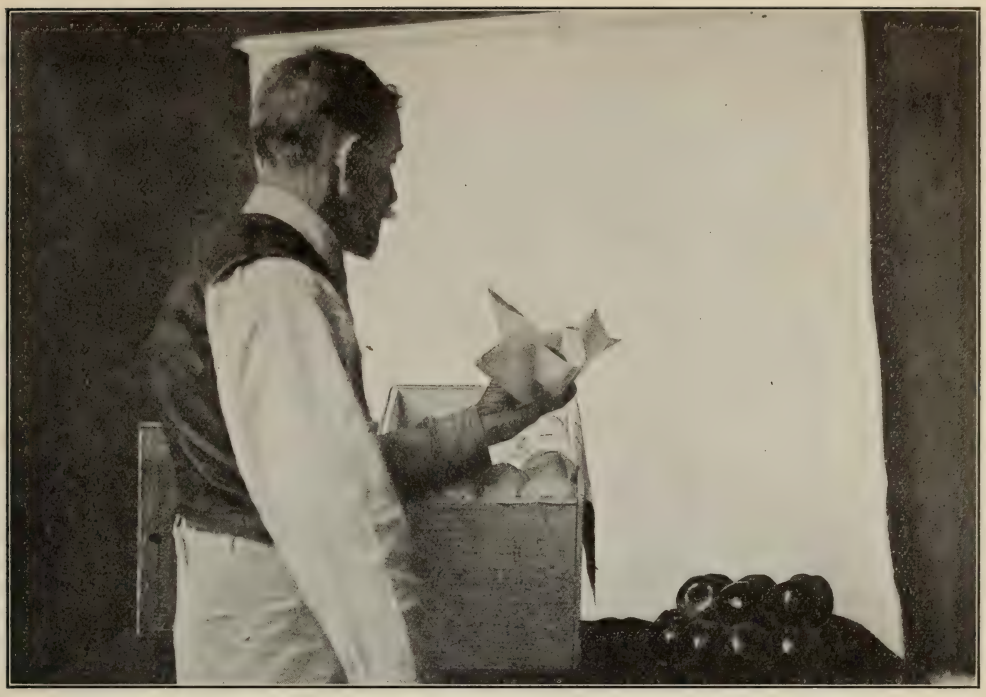


Fig. 1.

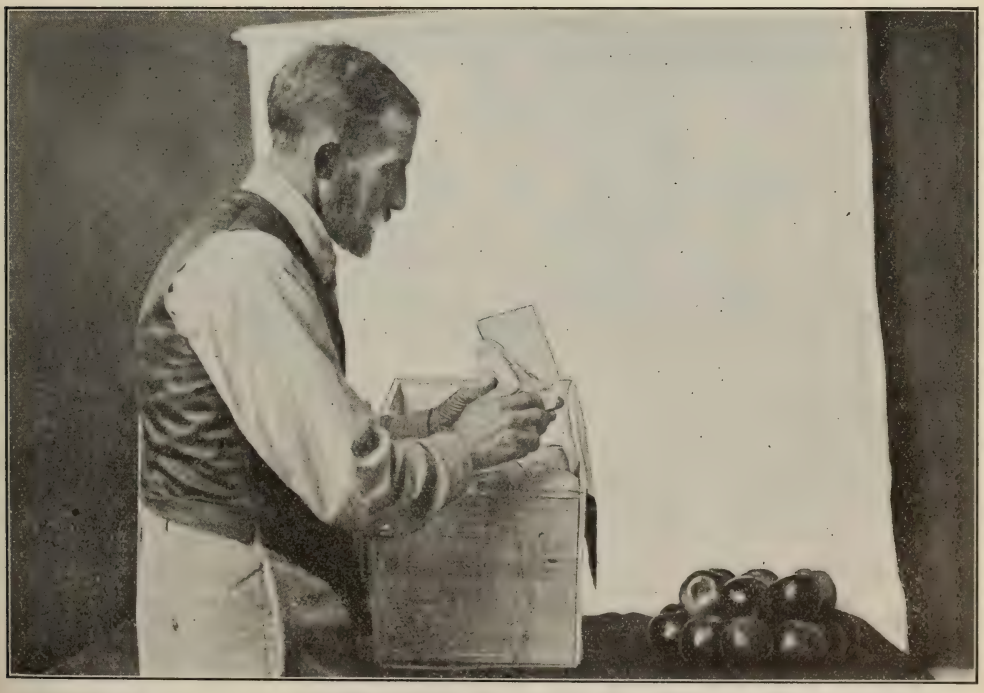


Fig. 2.

Wrapping Apples.

Baldwin.				Ben Davis.			
Specimen	Transverse.		Longitudinal Inch.	Specimen.	Transverse.		Longitudinal Inch.
	Max. inch.	Min. inch.			Max. inch.	Min. inch.	
1	3·25	3·00	2·50	1	3·00	2·93	2·50
2	3·00	2·93	2·50	2	3·06	3·00	2·37
3	3·00	2·75	2·25	3	3·00	2·93	2·50
4	2·93	2·75	2·37	4	3·00	2·93	2·50
5	2·62	2·50	2·12	5	2·87	2·75	2·75
6	2·62	2·50	2·31	6	2·87	2·68	2·43
7	2·75	2·75	2·12	7	3·06	2·87	2·62
8	2·87	2·75	2·37	8	3·06	2·87	2·31
9	2·75	2·50	2·00	9	2·75	2·62	2·37
10	2·75	2·62	2·50	10	3·00	2·81	2·62
11	2·75	2·62	2·25	11	3·00	2·87	2·68
12	2·75	2·62	2·37	12	2·87	2·75	2·50
13	2·87	2·87	2·25	13	2·06	2·93	2·50
14	2·87	2·62	2·31	14	2·87	2·75	2·50
15	2·81	2·75	2·50	15	2·81	2·75	2·56
16	2·75	2·75	2·37	16	2·12	2·87	2·50
17	2·87	2·75	2·25	17	2·75	2·56	2·25
18	2·93	2·93	2·50	18	2·75	2·62	2·62
19	2·75	2·75	2·25	19	2·87	2·75	2·37
20	2·75	2·62	2·25	20	2·75	2·62	2·50
21	2·87	2·75	2·37	21	2·87	2·75	2·50
22	2·75	2·62	2·25	22	2·62	2·56	2·50
23	2·87	2·75	2·25	23	2·87	2·87	2·43
24	2·75	2·62	2·25	24	2·75	2·62	2·25
25	2·68	2·62	2·25	25	2·75	2·62	2·25
Average	2·82	2·71	2·31	Average	2·89	2·77	2·47

CHANGING STYLE OF PACK.

A properly packed box has no change in the style of pack from top to bottom. Quite frequently there is a strong temptation on the part of the beginner to secure the proper height by changing from a pack on end to one on the side, returning perhaps to the original pack for the top layer. While there is no change, except simply placing the apple on its side, it is not a serious matter, though it is a confession of incompetency on the part of the packer, inasmuch as all ordinary commercial apples may be packed with absolute regularity. If, however, the type of pack is changed so that a 2-2 layer is placed upon a 2-3 layer the consequences are extremely serious. When packed in this way one layer rests almost of necessity upon another irregularly and not infrequently the cheek of one apple comes upon the stem of another. In any case, when pressure is put upon the apple, since this pressure is not borne regularly by all the apples, a few at least are sure to be seriously injured. Many merchants consider this so serious a defect that they feel justified in throwing out all boxes as culls that are discovered to be packed irregularly, and it is a question whether it is not a violation of the Inspection and Sale Act, under the clause which stipulates that all apples must be 'properly packed.' Apples so packed are sure to receive unnecessary injury and thus cannot be said to be properly packed.

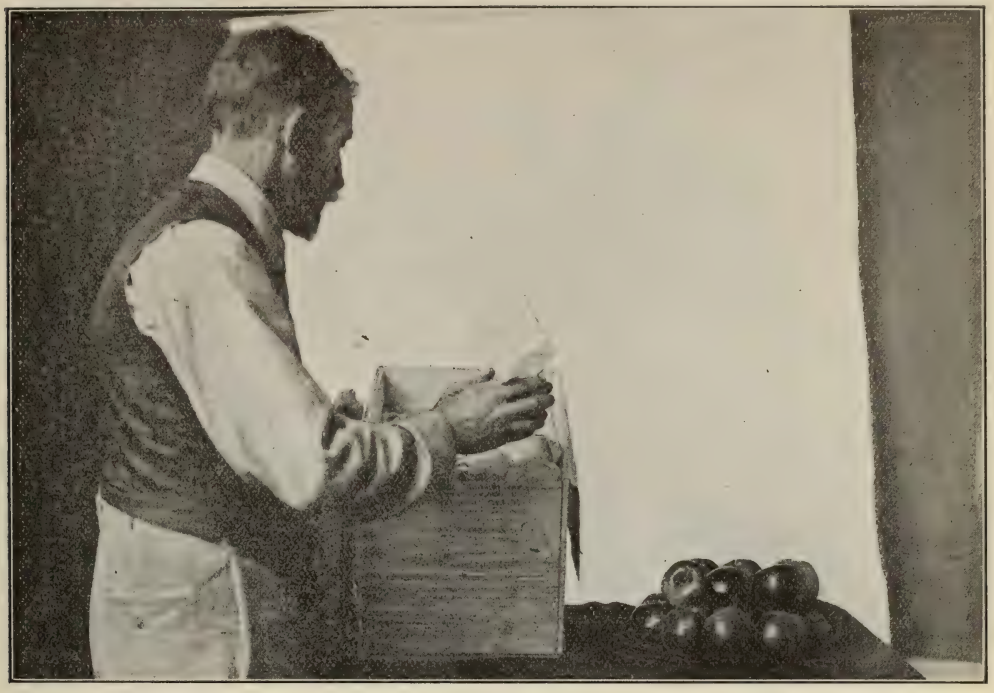


FIG. 1.

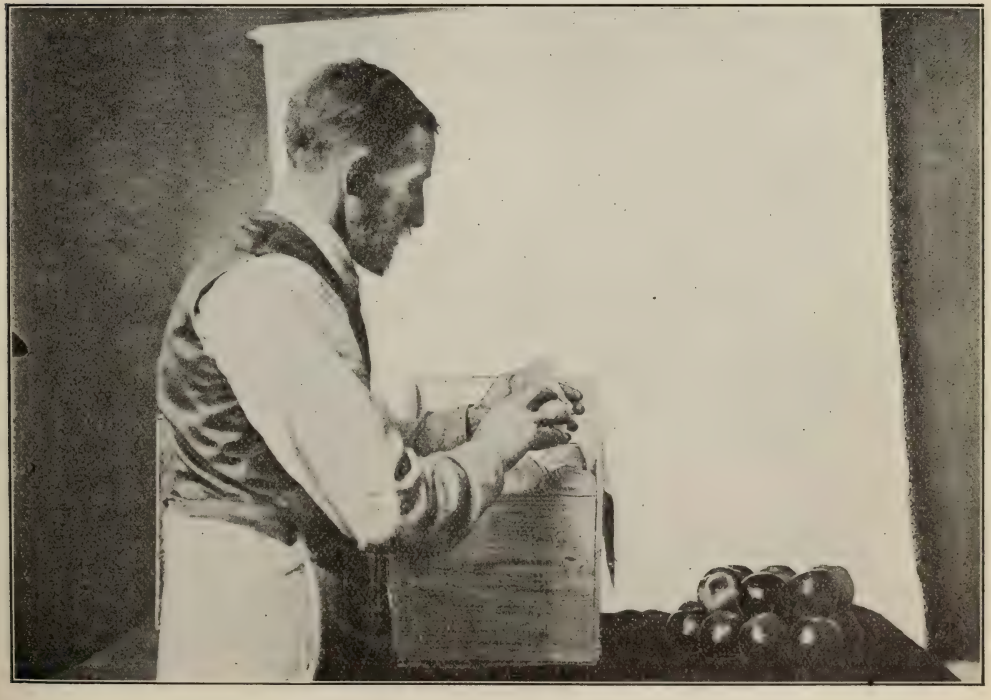


FIG. 2.

Wrapping Apples.

PACKING ONE OR SEVERAL BOXES AT THE SAME TIME.

It is becoming much more common among expert packers to grade the apples fairly carefully in the orchard to exclude all culls and No. 2 fruit, and then to place the No. 1 fruit in boxes at the right hand of the packer (presuming, of course, that he is a right-handed packer). The packer then has two, or in some cases even four, empty boxes before him. He picks up the apples just as they come, without any regard whatever to size, and places each in one of the boxes according to size, thus grading as he packs. Undoubtedly with expert packers this is the preferable way. It saves handling the fruit and dispenses with considerable sorting before the apples come to the packer's bench. The other method, of course, is where apples are placed upon the packing table and the packer proceeds to pack a single box, picking out from the heap the proper grade for size as he proceeds. Having finished a box of one size, he then proceeds to pack the sizes that are left. It can be readily seen that the packer has to do considerable sorting as he selects his fruit for a particular box, and in the process must shove the apples about more or less.

Plate 15, Fig. 2, shows an arrangement where a packer is packing into several boxes. In such cases it is better to have the packing bench against the wall and on a slope, with about six feet for each packer. The bench, of course, slopes at a convenient angle from the wall, and the paper is placed on a shelf just above the boxes. One objection to this arrangement is the difficulty of getting light. It would be better, in cases where this method of packing is adopted, to have the packing room on the southeast side of the building, if possible, insulated from the store room, and provided with a window for each packer.

THE WRAPPING OF AN APPLE.

In wrapping an apple it is not at all probable that any two packers will use exactly the same motions. They should, however, secure the same result; that is, a square of paper placed neatly around the apple so that in the main the surface will appear smooth and, while creases must be made towards the upper end or the tail of the wrap, these creases are evenly distributed, so that each specimen leaves the hand of the wrapper tightly wrapped, with neat folds, the main twist of the paper being over the stem of the apple. It should be the aim of the packer to acquire a set of motions that he will use uniformly throughout his work. There must be one particular way in which he can do it better than in any other way, and it is desirable that he should practice this until it becomes automatic. Below are given a number of photographs of an expert wrapper, taken at critical points in the operation. Although these positions from Plate 11 to Plate 14 are described at length, it will be readily understood that one motion follows the other so rapidly that the eye cannot follow it in actual practice. As a matter of fact, the eight positions blend into each other so imperceptibly and rapidly that an expert packer appears simply to be picking up apples with his right hand and paper with his left, and placing the wrapped apples in the box.

Plate 11, Fig. 1. The packer stands in front of the box which is being packed. The right hand reaches for the fruit at the same time as the left hand picks up the paper from the stand or bracket. In order to facilitate the picking up of the paper, the thumb or forefinger of the packer wears a cot or finger-stall of rubber.

Plate 11, Fig. 2. The packer is shown standing at one side of the box in order that the movements of his hands may be more clear. In the actual operation of packing he would, of course, remain facing the box. In this plate the apple is shown placed against the sheet of paper, the latter being still held in the left hand. In order to make speed the apple is often tossed or dropped on to

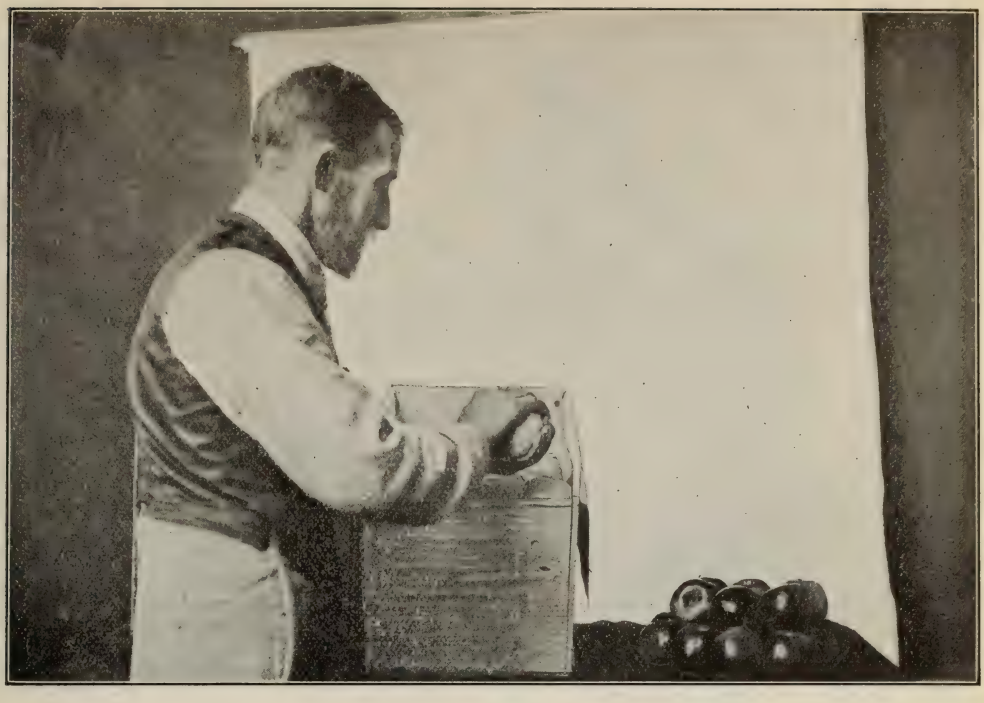


Fig. 1.

Fig. 2.

Wrapping Apples.

the sheet of paper with the stem towards the inner corner. The fingers of the left hand are slipped down behind the apple and paper in the shape of a funnel into which the apple quickly slides.

Plate 12, Fig. 1. The right hand lets go the fruit only to show its position. As shown in Fig. 2, it is again brought up against the apple and a complete fold of the paper is made towards the left hand. The left hand then slides smoothly with the paper up the far side of the fruit.

Plate 13. Perhaps the most difficult stage of the wrapping is shown in this plate. The upward movement of the left hand completely encases the apple in the paper, and great care must be taken that the wrapper is not held too tightly, or there is danger of breaking it. It is also important that the stem should not pierce the wrapper, and this danger may be obviated by folding the paper loosely over the stem in such a way that the stem is immediately beneath the meeting of the folds.

Plate 14, Fig. 1. In this illustration the packer has smoothed out all the creases of the paper giving a finish to the outside. Fig. 2. The apple is set in its place in the box, being pressed firmly down and toward the packed end of the box.

Plate 15, Fig. 1, shows a well packed box of the 2-2-7-7 style. Where apples are packed on end, the stem is always down.

THE 'BULGE' IN BOX PACKING.

In Plate 16, Fig. 2, a very essential feature of apple packing in boxes is shown. Eastern packers have been so long accustomed to the barrel, a rigid package, that it is difficult for them to conceive that the essential difference between box packing and barrel packing lies in the fact that the box is an elastic package. One of the essentials of good packing is the recognition of the elasticity of the top and bottom and the rigidity of the sides and ends of the box.

Plate 16, Fig. 3, shows four boxes of apples with the side as well as the top removed. For inspection purposes it is now much more common to remove the side than the top. Hence the necessity of having uniformity of pack throughout the box. A careful study of these boxes with the side and top removed will show how the bulge is secured by packing rather closer in the middle than at the end.

In box packing there is every inducement to uniformity in size. For each particular size the skilful packer has many different devices and modifications of this simple layering of the fruit by which he can accommodate the size of the apple to the unvarying dimensions of the box. The box, of course, has always the same dimensions, but the apples to be packed are constantly varying in size; and yet the experienced packer has no difficulty in securing an arrangement of the tiers so that after a certain number of tiers are placed in the box, the box is properly filled, with no large spaces through the box or showing on the surface.

Nevertheless, even the most skilled packer makes use of the slight differences in size and shape of the individual apples. These differences are so slight that they escape the attention of all but the practised eye. On page 48 is a table showing the differences in the transverse and longitudinal measurements of apples. This is given for the purpose of emphasizing the fact that there is, even in the most regular apples, a considerable difference between the different diameters. By turning the apple so as to present either the longer or shorter diameter, as the packer may require, perfect tightness and perfect alignment are attained. This difference in the shape of the apple and its various diameters is used, with other devices, to form the bulge of a well packed apple box. In the diagonal packs there is considerable leeway in the tightness with which apples are pressed against each other in the rows. By pushing them closer together towards the centre the apples are lifted, so that when the final tier is placed upon the box it will stand about 1¼ inches above the edge of the box at the centre, as shown in Plate 16, Fig. 2.

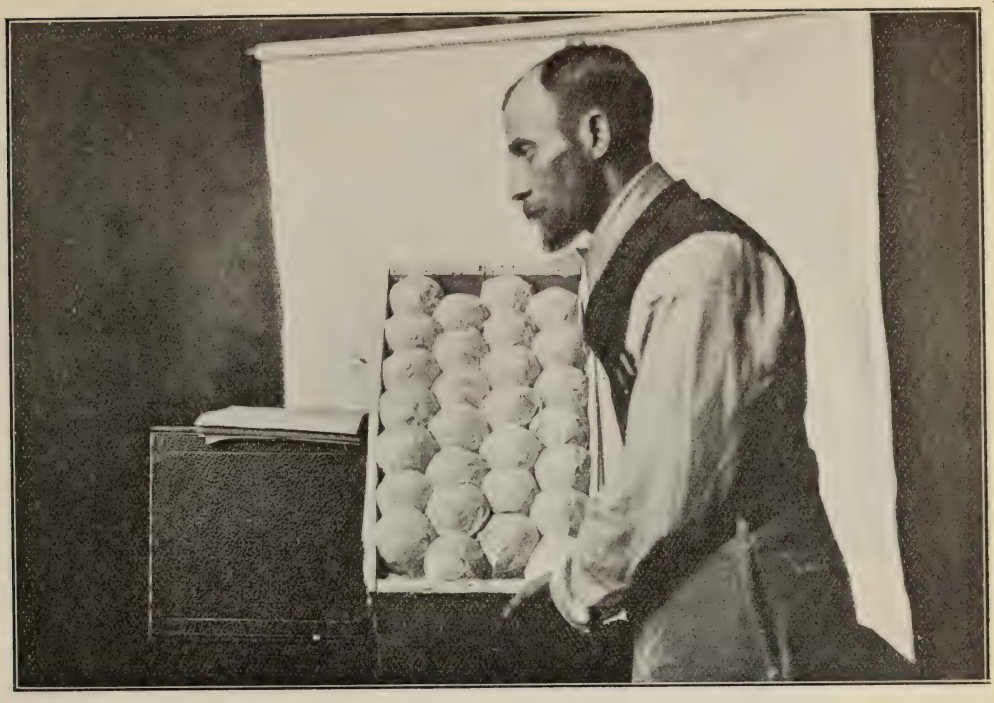


FIG. 1.

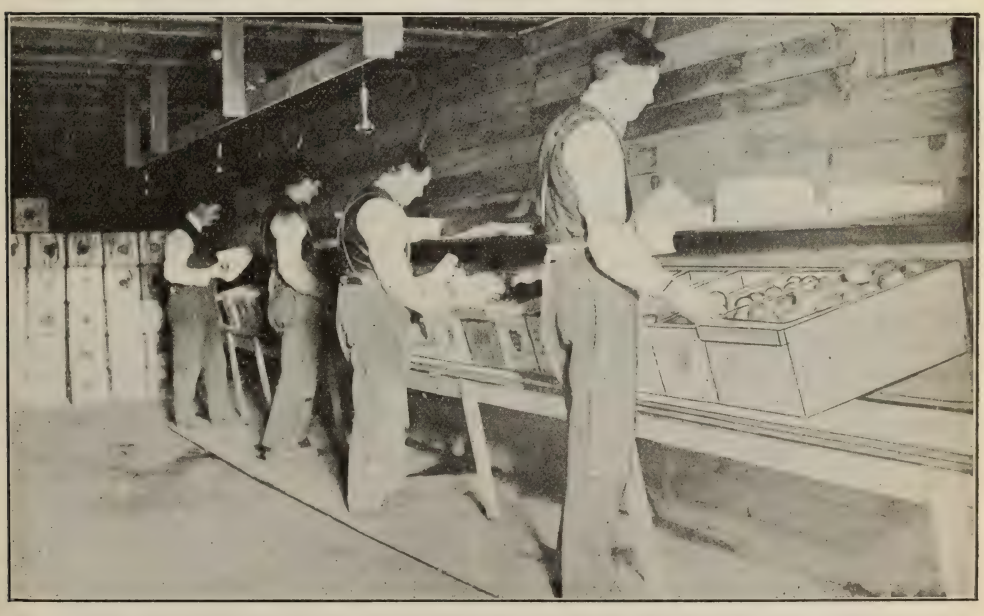


FIG. 2.

Samples of Box Packing.

The bulge in box packing is a most important feature. All fruit will evaporate somewhat after being packed. If the package is without the bulge a very slight evaporation will, by lessening the size of the specimens, render the whole package slack. By packing with a bulge, and pressing the thin elastic cover down upon the top of the apples, a force is brought to bear upon the fruit sufficient to keep it in place. As the fruit evaporates, the elasticity of the wood follows the fruit, always keeping it tight as packed. It may be well to note here that too much care cannot be taken in the selection of tops and bottoms of apple boxes. The material must be thin enough to bend easily and yet strong enough to resist the handling which it receives between the packer's bench and the retailer's shop.

BOX PRESS.

After the packing is completed, the cover must be carefully nailed in position. This is done on the press, an accessory too often thought unnecessary. The staff of the Fruit Division has been using a press illustrated in Plate 17. This can be readily made by anyone handy with tools, with such assistance as may be obtained at any blacksmith's shop.

In putting on the cover drive all nails through the cleats. Three or four nails in each end are quite sufficient.

PACKING BOXES.

Wherever possible the marks upon the end of a box should be printed with a die. These plates are not expensive and marking is done much more neatly and at a very small cost. A design for a copyrighted trade mark can be used in a die that would be entirely impossible if a stencil were used.

RUBBER STAMPS.

Every grower should have stamps for box marking. There should also be stamps for the number of apples in the box. These are not so numerous but that a separate stamp can be afforded for each number. There should also be stamps for the packer's number.

EXTRANEOUS MATTER IN A BOX.

Even five or six years ago it was not uncommon to find boxes entered for prizes at exhibitions in eastern Canada where large openings were filled with excelsior, paper or some similar material. Needless to say, this is not only unnecessary but would disqualify a box immediately from any particular contest. Of course, it is not allowable for commercial purposes, and only the most inexperienced would now think of resorting to such a practice. Nevertheless, it is deemed necessary to draw attention to an abuse that was at one time all too common. The same criticisms will apply to the use of corrugated paper board in lining boxes. They do, it is true, save the apples somewhat but customers generally resent the use of any kind of 'fillers' except the lining and wrapping papers.

WAREHOUSE APPLIANCES.

Plate 18, Figs. 1 and 3, illustrates two sides of a British Columbia fruit warehouse. The fruit is delivered at one side, and can be conveniently loaded on cars at the opposite side.

Plate 19, Figs. 1 and 2, shows the Perfection box truck, a very convenient appliance for the apple warehouse. It is made with a clutch, shown open in

FIG. 1. Common Commercial Packs.

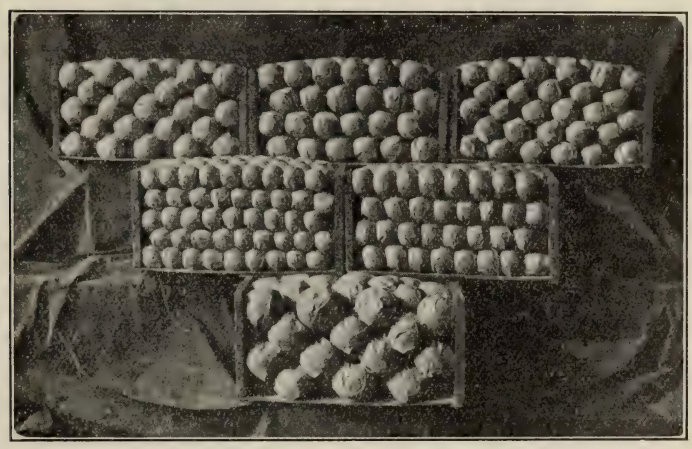


FIG. 2. Side removed to show Bulge.

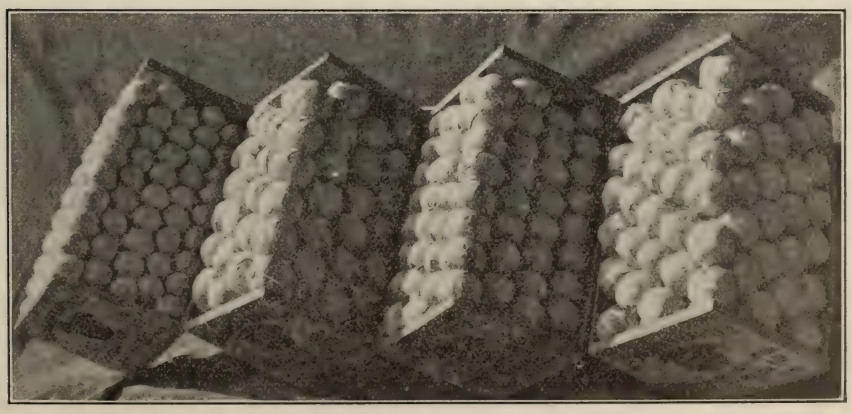
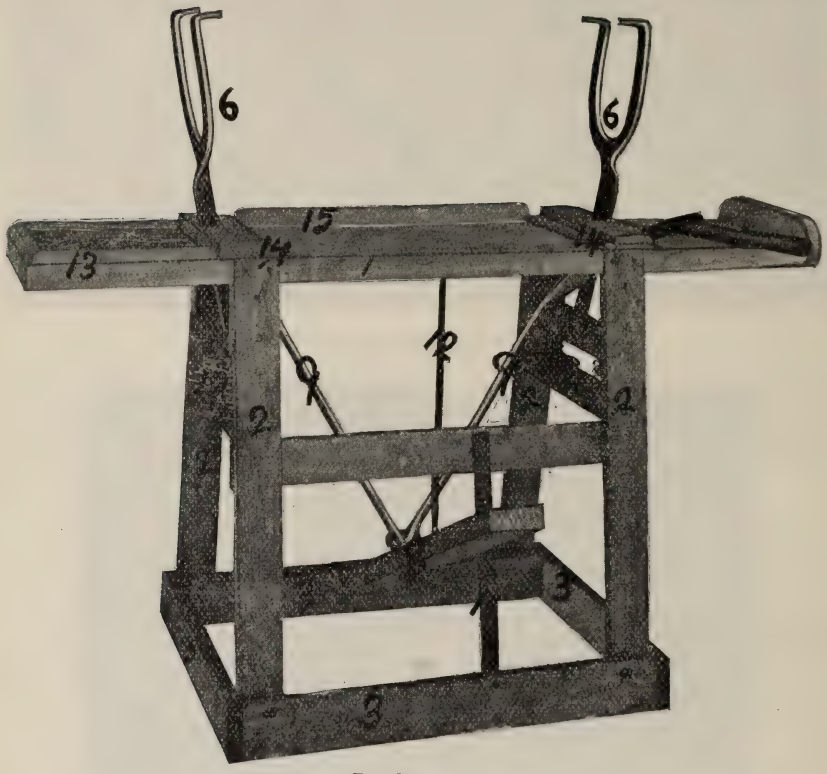


FIG. 3. Side removed to show Tier Alignment.



Box Press.

Plate 17 illustrates a press made by a member of the Fruit Division staff, with the assistance of a blacksmith, and has been found to work admirably, though much more elaborate nailing presses are upon the market.

1. The base of the press is a plank, dressed, $1\frac{3}{4}$", 14" wide and 3 feet long, though of course these dimensions could be varied slightly. 2. The supporting legs made firm by the (3) braces at the bottom. 4. Stationary cross-pieces supported by the legs. 5. A cross-piece about 16" from the base. 6. Iron clutches running through the base of the table to the cross-piece (7). 8. A foot-lever working up and down and attached to the bottom of the frame by a hinge. 9. Rods running from foot lever to the iron clutches. 10. Spiral springs placed between the movable cross-piece (7) and the stationary cross-piece (4). 11. A thin iron bar with a saw-tooth edge. A thin iron plate is placed on (8) so as to engage this saw-tooth edge 12. Long but light spiral spring that assists in raising the lever when disengaged from saw-tooth edge (11). 13. A shallow nail box. 14. Inch strips upon which the box rests, so that when pressure is brought to bear upon the top there will be room for the bulge below. 15. A narrow strip nailed on the back of the bench base to serve as a guide for placing the box.

The parts of the press 2, 3, 4, and 5 are inch stuff, 3 inches wide, dressed.

Fig. 1 and closed in Fig. 2 which ensures perfect safety in carrying fruit across the warehouse or from one point to another.

An enterprising Prince Edward Island fruit grower has installed in his warehouse a system of overhead tracks with a lifting arrangement similar to the ordinary farmer's feed trucks, differing only in having a fairly broad platform instead of a feed box. The tracks run conveniently across the warehouse and along both sides, so that barrels and boxes can be handled very rapidly and by one man without the drawback of heavy lifting.

For driving nails of course any ordinary light hammer can be used, but box packers prefer the hatchet shown in Plate 1 (A).

Convenient racks should be made in the warehouse for holding the different stamps so that they can be selected for use without loss of time.

Plate 19, Fig. 3 shows the usual warehouse appliance for making boxes. It is simply two slots that hold the end pieces while the one side is being nailed on. The box can then be turned over and the other side securely nailed, after which the bottom is added. In this cut the end pieces are shown in position, with the nailing hatchet to the right. The box material is shown on the bench at either side of the frame and on a shelf in front.

Attention is drawn to (A) Plate 19, Fig. 3. This is a nail box, arranged with slots so that the nailer can grasp as many nails as he wishes with his left hand and draw them out readily, point downward, and have them in the position where, with the least possible motion, he can use them in closing the box.

Plate 20, Fig. 1, shows a 'sloven wagon', used very commonly in the Maritime Provinces for all purposes. In the plate shown it is provided with a rack for carrying boxes and forms an admirable vehicle. It does away with high lifting, the load is conveniently placed for hauling and the only objectionable feature is that it requires more room to turn than an ordinary wagon. But its merits otherwise more than compensate for this defect. It can be readily provided with bolster springs.

There are also several orchard wagons, arranged with an appliance of cross-reaches that ensure that if the front hub will miss any obstacle such as a tree or post, the hind hub will also clear the same obstacle. These wagons, however, are better suited to peach orchards and light work rather than to the heavy loads that are necessary for apple orchards.

Perhaps the most commonly used vehicle for moving barrels is the small-wheeled wagon where the platform projects over the wheels. This, of course, has wide tires and is quite unsuited to hauling long distances, or for extra heavy loads, but it is extremely convenient about the farm as well as about the orchard.

NOTES FOR BEGINNERS.

1. Learn to size your fruit accurately and the placing in the box is a simple matter.

2. All apples are placed in the box in the same relative position. It cannot be impressed too strongly upon beginners that all sizes and shapes of apples can be properly and conveniently packed in the standard Canadian apple box.

3. Successful packing can only be done with apples of a uniform size in each box. There is no possibility of using an apple larger than the size being packed, and then attempting to straighten the row by using a small apple next to it.

4. Cleanliness cannot be too strongly insisted upon in every feature of box packing. Fingermarks upon boxes or careless rubbing in of moisture and dust are all too common. The most scrupulous attention should be given to the fruit and all specimens rejected that are not absolutely free from contamination of any sort.

A Convenient Warehouse. FIG. 1. Receiving Side. PLATE XVIII.

FIG. 2. Perfection Truck loaded.

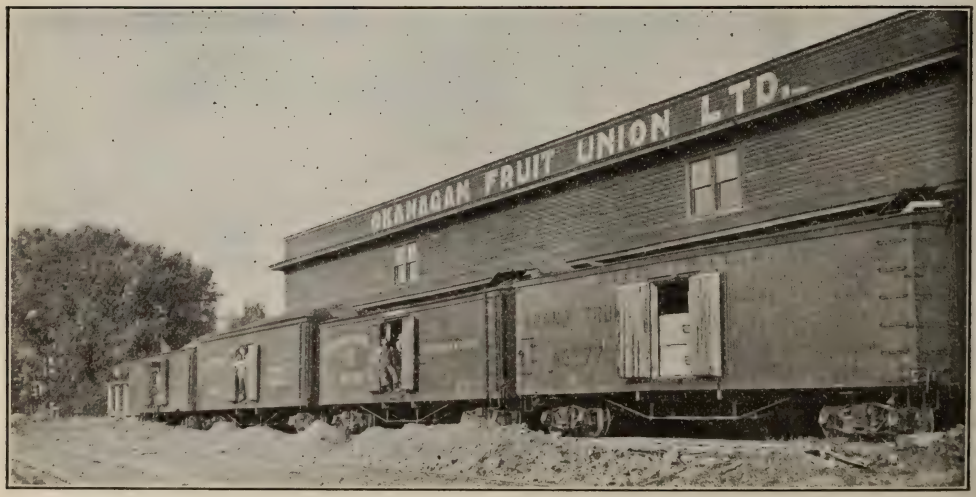


FIG. 3. Loading Side.

5. Should there be any dust or spray material upon the apples when picked, it is much easier to take it off at that time. If the apples are allowed to stand they acquire a certain gumminess that renders it difficult to make them look clean.

6. Box packing is the repetition of the same motions many hundred times a day. If, therefore, even one unnecessary motion is made with each specimen, it becomes a serious handicap in a day's work.

THE PACKING OF PEARS.

The Canadian apple box has proved too large a package for pears, but there is no uniformity in the pear boxes in actual use. The British Columbia package corresponds closely to the package used in the North-western States. A number of shippers in St. Catharines, Ont., use a box much smaller than the apple box. For the most part, however, Canadian pears are shipped to market in 11 quart baskets. The 11 quart basket has proved itself an excellent package for the local markets. It holds a reasonable quantity of fruit and, where care is taken, can be packed so as to present a very attractive appearance. It is conveniently retailed and ships well for short distances. Something might be said for it even for long distances, if the shippers would only take the trouble to deck the cars.

The method of packing the basket commonly used is simply a 'jumble' pack; that is, the baskets are filled without any regularity whatever, and covered with a lino cover. A few of the better growers have discovered that the basket can be packed with regular packs almost as conveniently as a box and that not only are the carrying qualities of the fruit enhanced, but the basket presents a much more pleasing appearance. Pears will repay wrapping and no regular packing, either in baskets or boxes, is complete without the wrapping.

The ideal package for pears will, in all probability, be a half box, somewhat shorter than our standard apple box, practically such as is used by the Californian trade.

There is less variation in the commercial sizes of pears than in apples. Consequently the number of packs actually used is less and there are few calls for anything but the ordinary 2-3 pack. The elongated form of the pear indicates very clearly that the tail of the wrap should always be over the stem end. In beginning the 2-3 pack, the calyx end will be placed against the end of the box. The second row, of course will be placed with the stem end toward the packer and so continued to the upper end of the box. The fullness of the box is quite easily secured by packing tighter or looser as in the case of apples. Occasionally a small sized pear will pack very conveniently in what might be called a loose offset, made by placing one pear in the left hand corner of the box, and then dividing the space evenly by three other pears. Of course, the same precautions are taken to pack with the calyx end to the box.

Practically all the general instruction given with reference to apple packing and packages applies to pears. The same care must be given to handling, grading packing and marking packages, but of course there are many things in the growing and marketing peculiar to each fruit. These are not touched in this bulletin.

PACKING FOR EXHIBITION.

Horticultural exhibitions of late years are making a feature of commercial packages and the score cards adopted by these exhibitions bring out prominently the essential features of good and bad packing and packages.

The Fruit Division, soon after its formation, issued a score card to the various fair managers in the Dominion, with the hope of securing some uniformity in the methods of judging fruit. This served a useful purpose,

FIG. 1. Perfection Truck—Open.

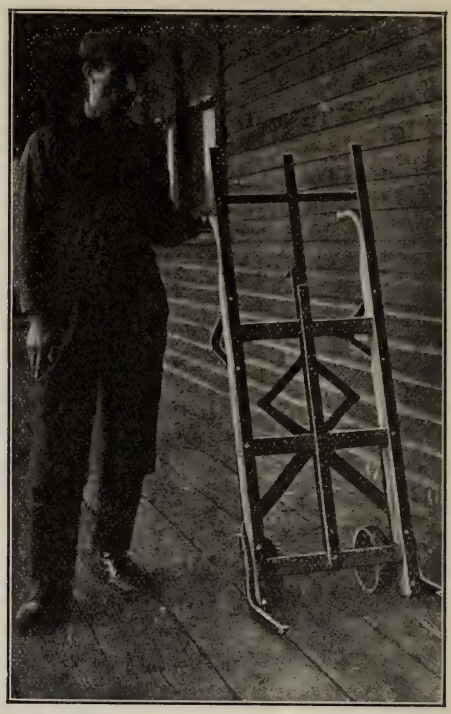


FIG. 2. Perfection Truck—Closed.

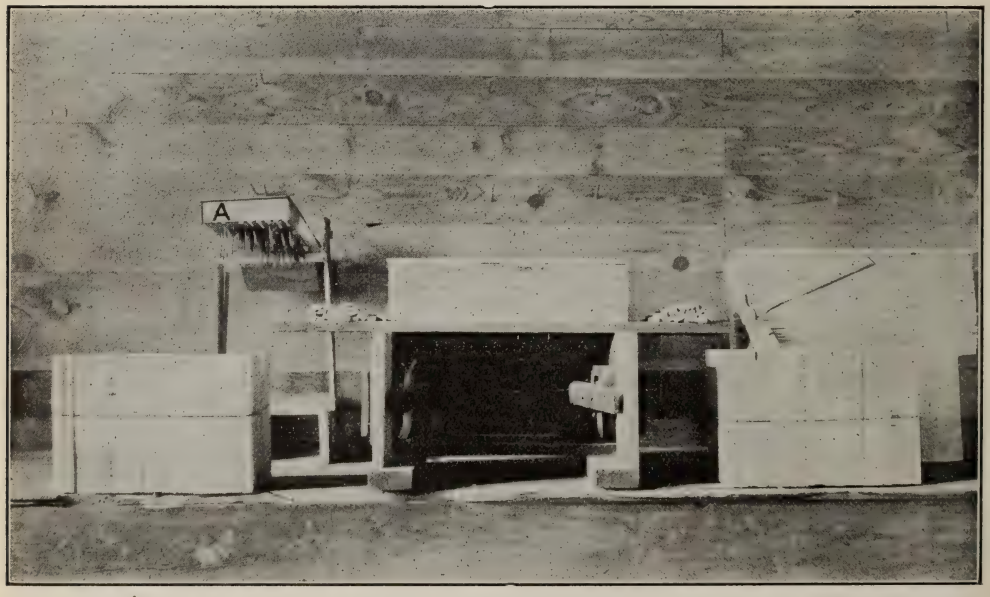


FIG. 3. Box-Making Bench.

and in the original form was used for many years. Some changes, however, have been made and the relative values of points have been altered somewhat. It is not at all likely that there will ever be perfect unanimity in the valuing of points for either packages or method of packing. After all, many of the points depend upon the purpose for which the package is intended, and certainly most of them are a matter of personal judgment. We give below the original score card recommended by the Fruit Division, as well as some modifications of this, as shown in the forms recommended by the Ontario Fruit Growers' Association, and the Massachusetts Fruit Show. In order that the values may be comparable we have taken 1,000 for the fruit packages and the fruit which they contain, allowing 350 for the package and the packing of the fruit.

	BARRELS.		
	Fruit Division	Ontario F.G.A.	Massachusetts Fruit Show.
Package—			
Staves	26	....	10
Hoops	35	....	10
Head	26	....	10
Nailing	18	....	20
Marking	26	....	20
Material	....	56	....
Finishing	....	84	....
Total	131	140	70
Packing—			
Facing	87	84	70
Tailing	44	28	60
Racking	44	42	80
Pressing	44	56	70
Total	219	210	280
		BOXES.	
Package—			
Material	35	42	30
Nailing and Cleating	26	....	....
Solidity	26	....	10
Marking	18	....	10
Style of Pack	26	....	....
Finishing Neatness	....	56	....
Total	131	98	50
Packing—			
Bulge or Swell	61	56	100
Height at Ends	44	....	60
Alignment	44	56	20
Tightness	70	70	80
Attractiveness and Style of Pack	....	70	40
Total	219	252	300

FIG. 1. Sloven Wagon.

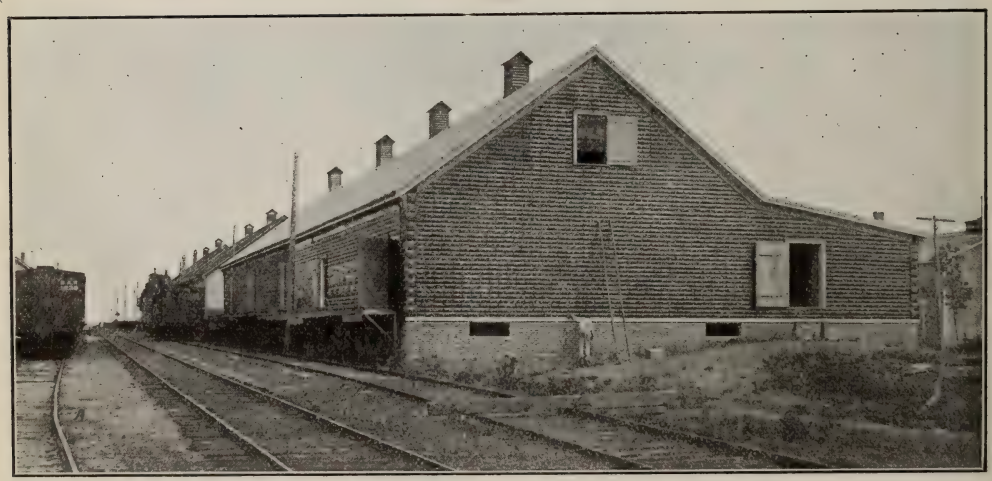


FIG. 2. Warehouse of the Berwick Fruit Company, Nova Scotia. Two other warehouses can be seen in the distant background. A corner of the Evaporator shows on the right.

NOTES ON SCORE CARDS.

The Ontario Fruit Growers' Association has grouped the points on 'Package' under the two heads 'Material' and 'Finishing,' which has the advantage of allowing the judges more scope with reference to the individual points. On the other hand it does not designate to the exhibitor the importance that is to be attached to each feature of the package. Of course, it must be understood that any very serious defect in any point would in all probability throw an exhibitor out of the running. For instance, a barrel composed of split staves or of uneven thickness would mean such a serious cut that it would require perhaps particular excellence in all other features to have any hope of winning.

The necessity for studying the score card will appear too in noting the relative value attached to the package and the packing, as seen in the value of 131 out of a possible 350 given by the Fruit Division, 140 by the Ontario Fruit Growers' Association and 70 by the Massachusetts Fruit Show. Inexperienced exhibitors should note that even such a small matter as the size and length of the nails will make a difference in score that may possibly turn the scale where other things are equal or nearly so, so that no feature of the packing can be neglected.

'Tightness of Pack' in boxes has reference to the firmness with which each apple is placed in its position, so as to be supported at as many points as possible by other apples. If tightness is perfect, no amount of jarring or racking will produce slackness in the box.

'Style of Pack' has reference to the judgment of the packer in selecting a style suitable to the size and shape of the apple. It is perhaps one of the severest tests of good packing.

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